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THE  
AMERICAN EPHEMERIS

AND  
NAUTICAL ALMANAC,

FOR THE YEAR

1872.

PUBLISHED BY AUTHORITY OF THE SECRETARY OF THE NAVY.

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BUREAU OF NAVIGATION,  
WASHINGTON.

1870.

~~130.4~~

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Per

2208

1870. April 21

April 9

J. B. C. C. C. C.  
Superintendent.

# CORRECTIONS.

Washington D.C.

Nautical Almanac Office,  
Cambridge, Mass.,

April 15<sup>th</sup>, 1870

Dear Sir, —

A copy of  
An Ephemeris of Nautical Almanac for 1872  
& of Tables of Harmonics

has been sent to you  
by mail

Please acknowledge the receipt.

Yours truly,

J. H. C. Coffin

Sup't Naut. Alm.

Prof. B. Peirce

d 113° 57.  
115° 44.  
0'' 7

26'' 8.  
10.9.  
59m. 41.  
1m. 834.  
63.74.  
45'.  
329° 9'.  
38'.  
+0'' 43.

d 28° 31.  
23'' 36.

F. +.05.  
.11.  
.17.  
.23.  
.28.  
.32.  
+.35.

d 10m.  
39° 81.  
43m.  
70'' 73.  
7493.  
6885.  
0254.  
18d 19h 8m 7s.8.  
17d 19h 31m 6s 0.  
July 17.  
505.



## PREFACE.

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THE preparation of the *American Ephemeris and Nautical Almanac* was begun in the latter part of the year 1849, in accordance with an act of Congress, approved on the 3d of March of that year. An account of this preparation and the values of the constants adopted will be found in the Preface and Appendix of the first volume, for the year 1855.

In the volume for 1865 the star ephemeris was greatly enlarged; new places of the stars adopted; the form for Moon Culminations and moon-culminating stars changed so that less space was required; mean solar time, instead of sidereal time, used in the dates of the ephemeris for the meridian of Washington; BESSEL's notation in the formulæ for star-reductions substituted for BAILY's; and several other changes of less importance were made.

In the volume for 1869 some slight changes were made in the ephemerides of Venus and Mars, and in the arrangement of the stars; and the explanations of the arrangement and use of the tables were revised so as to adapt them to the wants of operators at sea or in the field.

In the volume for 1870 the ephemeris of Neptune is derived from NEWCOMB's tables; the ephemerides of the outer planets are given for Washington mean noon instead of sidereal 0<sup>h</sup>; and hourly differences, instead of the logarithms, for interpolation; new places adopted for the standard stars; some changes made in the pages of occultations; and the table of positions of Observatories revised.

J. H. C. COFFIN,

*Prof. Math. U. S. Navy, Superintendent.*

WASHINGTON, January 1, 1870.





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# CHRONOLOGICAL ERAS AND CYCLES.

## CHRONOLOGICAL ERAS.

THE YEAR 1872, WHICH COMPRISES THE LATTER PART OF THE 96TH AND THE BEGINNING OF THE 97TH YEAR OF THE INDEPENDENCE OF THE UNITED STATES OF AMERICA, CORRESPONDS TO—

The year 6585 of the Julian Period;

“ 7380–81 of the Byzantine era;

“ 5632–33 of the Jewish era;

“ 2625 since the foundation of Rome, according to Varro;

“ 2619 since the beginning of the era of Nabonassar, which has been assigned to Wednesday, the 26th of February, of the 3967th year of the Julian Period, corresponding according to the chronologists to the 747th, and according to the astronomers to the 746th year before the birth of Christ.

“ 2648 of the Olympiads, or the fourth year of the 662d Olympiad, commencing in July, 1871, if we fix the era of the Olympiads at 775½ years before Christ, or near the beginning of July of the year 3938 of the Julian Period;

“ 2184 of the Grecian era, or the era of the Seleucidæ;

“ 1588 of the era of Diocletian.

The year 1289 of the Mohammedan era, or the era of the Hegira, begins on the 12th of March, 1872.

The first day of January of the year 1872 is the 2,404,794th day since the commencement of the Julian Period.

## CHRONOLOGICAL CYCLES.

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## SYMBOLS AND ABBREVIATIONS.

---

### SIGNS OF THE PLANETS, &c.

☉	The Sun.	♂	Mars.
☾	The Moon.	♃	Jupiter.
☿	Mercury.	♄	Saturn.
♀	Venus.	♅	Uranus.
⊕ or ♂	The Earth.	♆	Neptune.

### SIGNS OF THE ZODIAC.

Spring signs.	{	1.	♈	Aries.	Autumn signs.	{	7.	♎	Libra.
		2.	♉	Taurus.			8.	♏	Scorpio.
		3.	♊	Gemini.			9.	♐	Sagittarius.
Summer signs.	{	4.	♋	Cancer.	Winter signs.	{	10.	♑	Capricornus.
		5.	♌	Leo.			11.	♒	Aquarius.
		6.	♍	Virgo.			12.	♓	Pisces.

### ASPECTS.

♌	Conjunction, or having the same Longitude or Right Ascension.			
☐	Quadrature, or differing 90° in	"	"	"
♌	Opposition, or differing 180° in	"	"	"

### ABBREVIATIONS.

♌	Ascending Node.	'	Minutes of Arc
♎	Descending Node.	"	Seconds of Arc.
N.	North. S. South.	h	Hours.
E.	East. W. West.	m	Minutes of Time.
°	Degrees.	s	Seconds of Time.



# ASTRONOMICAL EPHEMERIS

FOR THE USE OF

## NAVIGATORS.

## AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S					Sidereal Time of the Semi-diameter passing the Meridian.	Equation of Time, to be added to Apparent Time.	Diff. for 1 hour.
		Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Semi-diameter.			
Mon.	1	<sup>h</sup> 18 <sup>m</sup> 45 <sup>s</sup> 27.53	11.046	S. 23° 2' 39".9	12.01	16' 18".42	71.07	<sup>m</sup> 3 <sup>s</sup> 37.21	1.187
Tues.	2	18 49 52.46	11.033	22 57 38.4	13.14	16 18.41	71.04	4 5.56	1.174
Wed.	3	18 54 17.10	11.019	22 52 9.3	14.28	16 18.40	71.00	4 33.56	1.160
Thur.	4	18 58 41.39	11.004	22 46 12.9	15.41	16 18.38	70.95	5 1.21	1.145
Frid.	5	19 3 5.29	10.987	22 39 49.3	16.54	16 18.35	70.89	5 28.48	1.128
Sat.	6	19 7 28.78	10.969	22 32 58.7	17.67	16 18.32	70.83	5 55.33	1.110
Sun.	7	19 11 51.81	10.950	22 25 41.3	18.77	16 18.29	70.77	6 21.74	1.091
Mon.	8	19 16 14.38	10.930	22 17 57.4	19.87	16 18.25	70.70	6 47.66	1.071
Tues.	9	19 20 36.43	10.908	22 9 47.1	20.96	16 18.21	70.63	7 13.07	1.049
Wed.	10	19 24 57.93	10.884	22 1 10.7	22.04	16 18.17	70.55	7 37.96	1.025
Thur.	11	19 29 18.87	10.860	21 52 8.7	23.12	16 18.13	70.47	8 2.27	1.001
Frid.	12	19 33 39.22	10.835	21 42 41.1	24.18	16 18.08	70.39	8 26.00	0.976
Sat.	13	19 37 58.95	10.809	21 32 48.1	25.23	16 18.03	70.31	8 49.10	0.950
Sun.	14	19 42 18.02	10.781	21 22 30.2	26.27	16 17.97	70.23	9 11.56	0.922
Mon.	15	19 46 36.42	10.753	21 11 47.5	27.29	16 17.91	70.14	9 33.35	0.894
Tues.	16	19 50 54.14	10.724	21 0 40.4	28.29	16 17.86	70.05	9 54.45	0.865
Wed.	17	19 55 11.15	10.694	20 49 9.3	29.29	16 17.79	69.95	10 14.83	0.836
Thur.	18	19 59 27.42	10.663	20 37 14.4	30.28	16 17.71	69.85	10 34.49	0.805
Frid.	19	20 3 42.94	10.631	20 24 56.2	31.24	16 17.63	69.75	10 53.41	0.773
Sat.	20	20 7 57.71	10.599	20 12 14.9	32.19	16 17.54	69.65	11 11.58	0.741
Sun.	21	20 12 11.71	10.567	19 59 11.1	33.13	16 17.45	69.54	11 28.98	0.709
Mon.	22	20 16 24.94	10.534	19 45 44.9	34.05	16 17.35	69.43	11 45.61	0.676
Tues.	23	20 20 37.37	10.501	19 31 56.6	34.96	16 17.24	69.32	12 1.44	0.643
Wed.	24	20 24 49.00	10.468	19 17 46.8	35.85	16 17.13	69.21	12 16.47	0.610
Thur.	25	20 28 59.84	10.435	19 3 15.9	36.73	16 17.03	69.10	12 30.70	0.577
Frid.	26	20 33 9.88	10.401	18 48 24.0	37.59	16 16.91	68.99	12 44.14	0.544
Sat.	27	20 37 19.11	10.367	18 33 11.5	38.43	16 16.78	68.88	12 56.79	0.510
Sun.	28	20 41 27.53	10.334	18 17 39.0	39.27	16 16.65	68.77	13 8.65	0.477
Mon.	29	20 45 35.16	10.300	18 1 46.7	40.08	16 16.51	68.66	13 19.68	0.443
Tues.	30	20 49 41.98	10.267	17 45 35.0	40.88	16 16.37	68.55	13 29.90	0.410
Wed.	31	20 53 47.99	10.234	17 29 4.4	41.67	16 16.22	68.43	13 39.34	0.377
Thur.	32	20 57 53.20	10.201	S. 17 12 15.1	42.43	16 16.07	68.32	13 47.98	0.344

NOTE.—Mean Time of the Semidiameter passing may be found by subtracting 0<sup>s</sup>.19 from the Sidereal Time.



## AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time, to be subtracted from Mean Time.	Diff. for 1 hour.	Sidereal Time or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.			
Mon.	1.	<sup>h</sup> 18 <sup>m</sup> 45 <sup>s</sup> 26.84	11.043	<sup>°</sup> 8.23 <sup>'</sup> 2 <sup>"</sup> 40.7	12.00	<sup>m</sup> 3 <sup>s</sup> 37.15	1.187	<sup>h</sup> 18 <sup>m</sup> 41 <sup>s</sup> 49.69
Tues.	2	18 49 51.71	11.030	22 57 39.3	13.13	4 5.46	1.174	18 45 46.25
Wed.	3.	18 54 16.26	11.016	22 52 10.3	14.27	4 33.45	1.160	18 49 42.81
Thur.	4	18 58 40.47	11.001	22 46 14.1	15.40	5 1.10	1.145	18 53 39.37
Frid.	5	19 3 4.29	10.984	22 39 50.7	16.53	5 28.36	1.128	18 57 35.93
Sat.	6	19 7 27.70	10.966	22 33 0.4	17.66	5 55.21	1.110	19 1 32.49
Sun.	7	19 11 50.65	10.947	22 25 43.3	18.76	6 21.61	1.091	19 5 29.04
Mon.	8	19 16 13.15	10.927	22 17 59.6	19.86	6 47.55	1.071	19 9 25.60
Tues.	9	19 20 35.10	10.905	22 9 49.6	20.95	7 12.94	1.049	19 13 22.16
Wed.	10	19 24 56.55	10.881	22 1 13.5	22.03	7 37.83	1.025	19 17 18.72
Thur.	11	19 29 17.42	10.857	21 52 11.8	23.11	8 2.14	1.001	19 21 15.28
Frid.	12	19 33 37.70	10.832	21 42 44.4	24.17	8 25.87	0.976	19 25 11.83
Sat.	13	19 37 57.35	10.806	21 32 51.8	25.22	8 48.96	0.950	19 29 8.39
Sun.	14	19 42 16.38	10.778	21 22 34.2	26.26	9 11.43	0.922	19 33 4.95
Mon.	15	19 46 34.72	10.750	21 11 51.8	27.28	9 33.21	0.894	19 37 1.51
Tues.	16	19 50 52.38	10.721	21 0 45.1	28.28	9 54.32	0.865	19 40 58.06
Wed.	17	19 55 9.32	10.692	20 49 14.3	29.28	10 14.70	0.836	19 44 54.62
Thur.	18	19 59 25.54	10.661	20 37 19.8	30.27	10 34.36	0.805	19 48 51.18
Frid.	19	20 3 41.02	10.629	20 25 1.9	31.23	10 53.29	0.773	19 52 47.73
Sat.	20	20 7 55.74	10.597	20 12 20.9	32.18	11 11.45	0.741	19 56 44.29
Sun.	21	20 12 9.70	10.565	19 59 17.4	33.12	11 28.85	0.709	20 0 40.85
Mon.	22	20 16 22.88	10.532	19 45 51.5	34.04	11 45.48	0.676	20 4 37.40
Tues.	23	20 20 35.27	10.499	19 32 3.6	34.95	12 1.31	0.643	20 8 33.96
Wed.	24	20 24 46.86	10.466	19 17 54.1	35.84	12 16.34	0.610	20 12 30.52
Thur.	25	20 28 57.66	10.433	19 3 23.5	36.72	12 30.58	0.577	20 16 27.08
Frid.	26	20 33 7.67	10.400	18 48 32.0	37.58	12 44.04	0.544	20 20 23.63
Sat.	27	20 37 16.87	10.366	18 33 19.8	38.42	12 56.68	0.510	20 24 20.19
Sun.	28	20 41 25.27	10.333	18 17 47.5	39.26	13 8.53	0.477	20 28 16.74
Mon.	29	20 45 32.88	10.299	18 1 55.6	40.07	13 19.58	0.443	20 32 13.30
Tues.	30	20 49 39.67	10.266	17 45 44.2	40.87	13 29.81	0.410	20 36 9.86
Wed.	31	20 53 45.66	10.233	17 29 13.8	41.66	13 39.25	0.377	20 40 6.41
Thur.	32	20 57 50.85	10.200	S.17 12 24.8	42.42	13 47.89	0.344	20 44 2.96

NOTE.—The Semidiameter for Mean Noon may be assumed the same as that for Apparent Noon.

Diff. for 1 hour  
+9<sup>s</sup>.8565

AT GREENWICH MEAN NOON.									
Day of the Month.	Day of the Year.	THE SUN'S					Logarithm of the Radius Vector of the Earth.	Diff. for 1 hour.	Mean Time of Sidereal Oh.
		True LONGITUDE.		Diff. for 1 hour.	LATITUDE.				
		$\lambda$	$\lambda'$						
1	1	280° 27' 1.1	27' 17.7	152.89	+0.85	.9926496	+ 0.8	5 <sup>h</sup> 17 <sup>m</sup> 18.17	
2	2	281 28 10.7	28 27.1	152.91	0.83	.9926527	1.8	5 13 22.26	
3	3	282 29 20.6	29 36.8	152.92	0.78	.9926582	2.8	5 9 26.35	
4	4	283 30 30.7	30 46.7	152.93	0.71	.9926660	3.7	5 5 30.44	
5	5	284 31 41.0	31 56.8	152.93	0.62	.9926759	4.5	5 1 34.52	
6	6	285 32 51.5	33 7.1	152.94	0.50	.9926878	5.4	4 57 38.61	
7	7	286 34 2.0	34 17.4	152.94	0.37	.9927015	6.2	4 53 42.70	
8	8	287 35 12.4	35 27.6	152.93	0.23	.9927170	6.9	4 49 46.79	
9	9	288 36 22.7	36 37.8	152.92	+0.09	.9927343	7.6	4 45 50.88	
10	10	289 37 32.8	37 47.7	152.91	−0.04	.9927533	8.3	4 41 54.97	
11	11	290 38 42.5	38 57.3	152.89	0.15	.9927739	8.9	4 37 59.06	
12	12	291 39 51.8	40 6.4	152.87	0.24	.9927961	9.6	4 34 3.15	
13	13	292 41 0.6	41 15.0	152.85	0.31	.9928200	10.3	4 30 7.23	
14	14	293 42 8.8	42 23.0	152.82	0.35	.9928456	11.0	4 26 11.32	
15	15	294 43 16.3	43 30.3	152.79	0.36	.9928729	11.8	4 22 15.41	
16	16	295 44 23.0	44 36.8	152.76	0.34	.9929022	12.6	4 18 19.50	
17	17	296 45 28.8	45 42.5	152.72	0.30	.9929335	13.5	4 14 23.58	
18	18	297 46 33.7	46 47.2	152.69	0.22	.9929669	14.4	4 10 27.67	
19	19	298 47 37.7	47 51.1	152.65	−0.12	.9930025	15.3	4 6 31.76	
20	20	299 48 40.9	48 54.1	152.61	0.00	.9930404	16.3	4 2 35.85	
21	21	300 49 43.2	49 56.3	152.57	+0.13	.9930807	17.3	3 58 39.94	
22	22	301 50 44.5	50 57.4	152.53	0.26	.9931235	18.3	3 54 44.03	
23	23	302 51 44.6	51 57.4	152.49	0.39	.9931690	19.4	3 50 48.12	
24	24	303 52 43.5	52 56.1	152.46	0.50	.9932172	20.5	3 46 52.20	
25	25	304 53 42.2	53 54.7	152.42	0.60	.9932680	21.7	3 42 56.29	
26	26	305 54 39.8	54 52.1	152.38	0.68	.9933215	22.8	3 39 0.38	
27	27	306 55 36.4	55 48.6	152.34	0.73	.9933776	23.9	3 35 4.47	
28	28	307 56 32.1	56 44.1	152.30	0.75	.9934363	25.0	3 31 8.56	
29	29	308 57 27.1	57 39.0	152.27	0.75	.9934976	26.0	3 27 12.65	
30	30	309 58 21.4	58 33.1	152.24	0.72	.9935611	26.9	3 23 16.74	
31	31	310 59 14.9	59 26.5	152.21	0.65	.9936269	27.8	3 19 20.83	
32	32	312 0 7.6	0 19.0	152.18	+0.56	.9936947	+28.6	3 15 24.92	
NOTE: $\lambda$ corresponds to the true equinox of the date, $\lambda'$ to the mean equinox of January 0d.								Diff. for 1 hour −9 <sup>s</sup> .8296	

## GREENWICH MEAN TIME.

Day of the Month.	THE MOON'S								
	SEMI- DIAMETER.		HORIZONTAL PARALLAX.				MERIDIAN PASSAGE.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 hour.	Midnight.	Diff. for 1 hour.		Diff. for 1 hour.	Noon.
1	15' 8.1	15' 13.0	55' 26.2	+1.43	55' 44.2	+1.58	<sup>h</sup> 16 <sup>m</sup> 50.0	<sup>m</sup> 1.83	<sup>d</sup> 20.3
2	15 18.5	15 24.3	56 4.1	1.73	56 25.7	1.87	17 34.1	1.85	21.3
3	15 30.7	15 37.4	56 49.0	2.00	57 13.8	2.12	18 19.1	1.91	22.3
4	15 44.5	15 51.9	57 39.8	2.21	58 6.8	2.28	19 6.1	2.03	23.3
5	15 59.4	16 6.8	58 34.3	2.30	59 1.8	2.27	19 56.5	2.20	24.3
6	16 14.2	16 21.1	59 28.7	2.20	59 54.3	2.06	20 51.4	2.42	25.3
7	16 27.6	16 33.3	60 18.0	1.87	60 38.9	1.61	21 51.3	2.59	26.3
8	16 38.1	16 41.8	60 56.5	1.30	61 10.0	0.95	22 55.5	2.73	27.3
9	16 47.2	16 45.3	61 19.1	+0.55	61 23.2	+0.13	6		28.3
10	16 45.1	16 43.4	61 22.3	-0.39	61 16.2	-0.71	0 1.6	2.74	29.3
11	16 40.5	16 36.2	61 5.3	1.11	60 49.8	1.47	1 6.5	2.26	0.9
12	16 30.9	16 24.7	60 30.2	1.78	60 7.3	2.03	2 7.4	2.44	1.9
13	16 17.7	16 10.1	59 41.6	2.23	59 14.0	2.36	3 3.5	2.22	2.9
14	16 2.3	15 54.3	58 45.1	2.43	58 15.8	2.45	3 54.8	2.05	3.9
15	15 46.3	15 38.6	57 46.5	2.42	57 18.0	2.34	4 42.4	1.93	4.9
16	15 31.1	15 24.1	56 50.6	2.27	56 24.7	2.08	5 27.5	1.84	5.9
17	15 17.5	15 11.5	56 0.7	1.92	55 38.7	1.74	6 11.4	1.82	6.9
18	15 6.1	15 1.4	55 18.9	1.56	55 1.3	1.37	6 55.2	1.84	7.9
19	14 57.2	14 53.7	54 46.1	1.17	54 33.1	0.98	7 39.7	1.88	8.9
20	14 50.8	14 48.4	54 22.4	0.80	54 13.9	0.62	8 25.5	1.94	9.9
21	14 46.7	14 45.5	54 7.5	0.45	54 3.0	-0.29	9 13.0	2.01	10.9
22	14 44.8	14 44.6	54 0.5	-0.14	53 59.7	+0.00	10 1.9	2.06	11.9
23	14 44.8	14 45.4	54 0.5	+0.13	54 2.7	0.25	10 51.8	2.08	12.9
24	14 46.4	14 47.8	54 6.4	0.36	54 11.4	0.44	11 41.6	2.06	13.9
25	14 49.4	14 51.4	54 17.5	0.55	54 24.6	0.64	12 30.5	2.01	14.9
26	14 53.6	14 56.1	54 32.9	0.73	54 42.2	0.81	13 18.1	1.95	15.9
27	14 58.9	15 2.0	54 52.5	0.90	55 3.8	0.98	14 4.1	1.89	16.9
28	15 5.4	15 9.0	55 16.1	1.07	55 29.4	1.15	14 48.7	1.84	17.9
29	15 12.9	15 17.1	55 43.8	1.24	55 59.3	1.33	15 32.6	1.83	18.9
30	15 21.6	15 26.4	56 15.8	1.42	56 33.4	1.51	16 16.7	1.86	19.9
31	15 31.5	15 36.8	56 52.0	1.59	57 11.6	1.67	17 1.9	1.93	20.9
32	15 42.4	15 48.2	57 32.1	+1.74	57 53.3	+1.80	17 49.4	2.05	21.9

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
MONDAY 1.					WEDNESDAY 3.				
0	11 1 45.10	1.9580	N. 11 51' 1.6"	11.544	0	12 35 22.25	1.9673	N. 1 41' 30.0"	13.584
1	11 3 42.54	1.9568	11 39 27.2	11.603	1	12 37 20.35	1.9692	1 27 55.5	13.587
2	11 5 39.92	1.9556	11 27 49.2	11.662	2	12 39 18.56	1.9711	1 14 19.6	13.609
3	11 7 37.23	1.9545	11 16 7.7	11.730	3	12 41 16.88	1.9731	1 0 42.4	13.630
4	11 9 34.47	1.9535	11 4 22.8	11.777	4	12 43 15.32	1.9752	0 47 4.0	13.650
5	11 11 31.65	1.9525	10 52 34.5	11.834	5	12 45 13.90	1.9774	0 33 24.4	13.670
6	11 13 28.77	1.9515	10 40 42.8	11.890	6	12 47 12.62	1.9797	0 19 43.7	13.688
7	11 15 25.84	1.9506	10 28 47.8	11.945	7	12 49 11.47	1.9820	N. 0 6 1.9	13.705
8	11 17 22.85	1.9498	10 16 49.5	11.999	8	12 51 10.46	1.9843	S. 0 7 40.9	13.721
9	11 19 19.82	1.9490	10 4 48.0	12.053	9	12 53 9.59	1.9868	0 21 24.7	13.737
10	11 21 16.74	1.9483	9 52 43.3	12.104	10	12 55 8.88	1.9894	0 35 9.4	13.752
11	11 23 13.62	1.9477	9 40 35.5	12.156	11	12 57 8.33	1.9920	0 48 54.9	13.768
12	11 25 10.46	1.9470	9 28 24.5	12.208	12	12 59 7.93	1.9947	1 2 41.2	13.779
13	11 27 7.26	1.9464	9 16 10.4	12.259	13	13 1 7.70	1.9975	1 16 28.3	13.790
14	11 29 4.03	1.9458	9 3 53.3	12.309	14	13 3 7.64	2.0005	1 30 16.0	13.801
15	11 31 0.78	1.9454	8 51 33.3	12.358	15	13 5 7.76	2.0035	1 44 4.4	13.811
16	11 32 57.50	1.9451	8 39 10.3	12.407	16	13 7 8.06	2.0065	1 57 53.4	13.820
17	11 34 54.20	1.9448	8 26 44.4	12.455	17	13 9 8.54	2.0096	2 11 42.8	13.828
18	11 36 50.88	1.9445	8 14 15.7	12.502	18	13 11 9.21	2.0128	2 25 32.7	13.835
19	11 38 47.55	1.9443	8 1 44.2	12.549	19	13 13 10.08	2.0160	2 39 23.0	13.841
20	11 40 44.20	1.9442	7 49 9.9	12.595	20	13 15 11.14	2.0193	2 53 13.6	13.846
21	11 42 40.85	1.9442	7 36 32.8	12.640	21	13 17 12.41	2.0228	3 7 4.5	13.850
22	11 44 37.50	1.9442	7 23 53.1	12.684	22	13 19 13.89	2.0263	3 20 55.6	13.853
23	11 46 34.15	1.9442	N. 7 11 10.8	12.728	23	13 21 15.58	2.0300	S. 3 34 45.8	13.854
TUESDAY 2.					THURSDAY 4.				
0	11 48 30.80	1.9443	N. 6 58 25.8	12.771	0	13 23 17.50	2.0337	S. 3 48 38.1	13.855
1	11 50 27.46	1.9443	6 45 38.3	12.813	1	13 25 19.64	2.0375	4 2 29.4	13.855
2	11 52 24.13	1.9446	6 32 48.3	12.853	2	13 27 22.01	2.0413	4 16 20.6	13.853
3	11 54 20.82	1.9450	6 19 55.9	12.893	3	13 29 24.61	2.0453	4 30 11.7	13.850
4	11 56 17.53	1.9453	6 7 1.1	12.933	4	13 31 27.45	2.0493	4 44 2.6	13.846
5	11 58 14.26	1.9457	5 54 3.9	12.973	5	13 33 30.54	2.0535	4 57 53.2	13.841
6	12 0 11.02	1.9462	5 41 4.3	13.013	6	13 35 33.87	2.0577	5 11 43.5	13.835
7	12 2 7.81	1.9468	5 28 2.4	13.050	7	13 37 37.46	2.0619	5 25 33.4	13.827
8	12 4 4.64	1.9475	5 14 58.4	13.086	8	13 39 41.30	2.0662	5 39 22.8	13.818
9	12 6 1.51	1.9483	5 1 52.2	13.121	9	13 41 45.41	2.0707	5 53 11.6	13.808
10	12 7 58.42	1.9489	4 48 43.9	13.156	10	13 43 49.79	2.0752	6 6 59.8	13.796
11	12 9 55.38	1.9496	4 35 33.5	13.191	11	13 45 54.44	2.0798	6 20 47.4	13.787
12	12 11 52.40	1.9507	4 22 21.0	13.225	12	13 47 59.37	2.0845	6 34 34.2	13.774
13	12 13 49.47	1.9517	4 9 6.5	13.258	13	13 50 4.58	2.0893	6 48 20.2	13.759
14	12 15 46.60	1.9527	3 55 50.1	13.290	14	13 52 10.08	2.0942	7 2 5.2	13.743
15	12 17 43.80	1.9538	3 42 31.8	13.320	15	13 54 15.88	2.0991	7 15 49.2	13.726
16	12 19 41.07	1.9550	3 29 11.7	13.350	16	13 56 21.98	2.1040	7 29 32.2	13.708
17	12 21 38.41	1.9563	3 15 49.8	13.380	17	13 58 28.37	2.1090	7 43 14.0	13.688
18	12 23 35.83	1.9576	3 2 26.1	13.409	18	14 0 35.07	2.1142	7 56 54.7	13.667
19	12 25 33.33	1.9590	2 49 0.7	13.437	19	14 2 42.08	2.1195	8 10 34.1	13.644
20	12 27 30.92	1.9605	2 35 33.7	13.464	20	14 4 49.41	2.1248	8 24 12.0	13.620
21	12 29 28.61	1.9621	2 22 5.0	13.491	21	14 6 57.08	2.1302	8 37 48.5	13.596
22	12 31 26.39	1.9638	2 8 34.8	13.516	22	14 9 5.06	2.1357	8 51 23.4	13.571
23	12 33 24.27	1.9655	1 55 3.1	13.540	23	14 11 13.37	2.1413	9 4 56.8	13.544
24	12 35 22.25	1.9673	N. 1 41 30.0	13.564	24	14 13 22.02	2.1470	S. 9 18 28.5	13.515

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
FRIDAY 5.					SUNDAY 7.				
0	14 <sup>h</sup> 13 <sup>m</sup> 22.02 <sup>s</sup>	2.1470	S. 9° 18' 28.5"	13.515	0	16 <sup>h</sup> 4 <sup>m</sup> 10.86 <sup>s</sup>	2.4935	S. 19° 3' 12.8"	10.175
1	14 15 31.01	2.1507	9 31 58.4	13.484	1	16 6 40.41	2.4993	19 13 19.8	10.000
2	14 17 40.34	2.1586	9 45 26.4	13.451	2	16 9 10.42	2.5042	19 23 19.9	9.943
3	14 19 50.03	2.1643	9 58 52.4	13.416	3	16 11 40.91	2.5120	19 33 12.9	9.894
4	14 22 0.07	2.1703	10 12 16.3	13.381	4	16 14 11.87	2.5198	19 42 58.7	9.703
5	14 24 10.47	2.1783	10 25 38.1	13.345	5	16 16 43.29	2.5275	19 52 37.2	9.580
6	14 26 21.24	2.1865	10 38 57.7	13.307	6	16 19 15.17	2.5358	20 2 8.3	9.455
7	14 28 32.38	2.1887	10 52 15.0	13.268	7	16 21 47.51	2.5420	20 11 31.8	9.306
8	14 30 43.88	2.1940	11 5 29.8	13.227	8	16 24 20.32	2.5507	20 20 47.7	9.199
9	14 32 55.76	2.2019	11 18 42.2	13.184	9	16 26 53.59	2.5594	20 29 55.8	9.089
10	14 35 8.02	2.2075	11 31 52.0	13.140	10	16 29 27.32	2.5680	20 38 56.0	8.937
11	14 37 20.67	2.2140	11 44 59.1	13.094	11	16 32 1.50	2.5734	20 47 48.2	8.802
12	14 39 33.71	2.2206	11 58 3.3	13.046	12	16 34 36.12	2.5806	20 56 32.2	8.665
13	14 41 47.14	2.2271	12 11 4.7	12.998	13	16 37 11.19	2.5883	21 5 8.0	8.537
14	14 44 0.97	2.2336	12 24 3.1	12.948	14	16 39 46.71	2.5958	21 13 35.4	8.387
15	14 46 15.21	2.2406	12 36 58.5	12.896	15	16 42 22.68	2.6031	21 21 54.4	8.245
16	14 48 29.85	2.2473	12 49 50.7	12.842	16	16 44 59.08	2.6103	21 30 4.8	8.101
17	14 50 44.90	2.2540	13 2 39.6	12.787	17	16 47 35.91	2.6174	21 38 6.5	7.956
18	14 53 0.36	2.2619	13 15 25.2	12.730	18	16 50 13.16	2.6245	21 45 59.4	7.807
19	14 55 16.24	2.2689	13 28 7.3	12.671	19	16 52 50.84	2.6315	21 53 43.3	7.657
20	14 57 32.54	2.2759	13 40 45.8	12.611	20	16 55 28.94	2.6385	22 1 18.2	7.506
21	14 59 49.27	2.2830	13 53 20.6	12.549	21	16 58 7.45	2.6453	22 8 44.0	7.353
22	15 2 6.42	2.2903	14 5 51.6	12.485	22	17 0 46.37	2.6520	22 16 0.5	7.198
23	15 4 24.00	2.2966	S. 14° 18' 18.7"	12.419	23	17 3 25.69	2.6587	S. 22° 23' 7.7"	7.040
SATURDAY 6.					MONDAY 8.				
0	15 6 42.01	2.3038	S. 14° 30' 41.9"	12.352	0	17 6 5.40	2.6659	S. 22° 30' 5.5"	6.886
1	15 9 0.46	2.3111	14 43 1.0	12.283	1	17 8 45.51	2.6717	22 36 53.7	6.794
2	15 11 19.35	2.3185	14 55 15.8	12.212	2	17 11 26.00	2.6780	22 43 32.2	6.580
3	15 13 38.69	2.3259	15 7 26.3	12.139	3	17 14 6.86	2.6840	22 50 1.0	6.396
4	15 15 58.47	2.3333	15 19 32.4	12.064	4	17 16 48.10	2.6893	22 56 19.9	6.233
5	15 18 18.70	2.3408	15 31 34.0	11.988	5	17 19 29.70	2.6953	23 2 28.9	6.066
6	15 20 39.38	2.3483	15 43 30.9	11.910	6	17 22 11.66	2.7009	23 8 27.9	5.896
7	15 23 0.52	2.3560	15 55 23.1	11.830	7	17 24 53.96	2.7079	23 14 16.7	5.738
8	15 25 22.11	2.3637	16 7 10.4	11.748	8	17 27 36.60	2.7135	23 19 55.3	5.557
9	15 27 44.16	2.3713	16 18 52.7	11.663	9	17 30 19.58	2.7190	23 25 23.6	5.365
10	15 30 6.67	2.3790	16 30 29.9	11.578	10	17 33 2.88	2.7243	23 30 41.5	5.211
11	15 32 29.64	2.3867	16 42 2.0	11.491	11	17 35 46.49	2.7295	23 35 48.9	5.035
12	15 34 53.07	2.3944	16 53 28.8	11.402	12	17 38 30.40	2.7345	23 40 45.7	4.858
13	15 37 16.97	2.4022	17 4 50.2	11.310	13	17 41 14.62	2.7393	23 45 31.9	4.680
14	15 39 41.34	2.4100	17 16 6.0	11.216	14	17 43 59.12	2.7440	23 50 7.3	4.501
15	15 42 6.17	2.4178	17 27 16.0	11.120	15	17 46 43.89	2.7485	23 54 32.0	4.381
16	15 44 31.48	2.4256	17 38 20.3	11.023	16	17 49 28.94	2.7529	23 58 45.8	4.139
17	15 46 57.25	2.4334	17 49 18.7	10.924	17	17 52 14.24	2.7578	24 2 48.6	3.955
18	15 49 23.49	2.4413	18 0 11.1	10.823	18	17 54 59.79	2.7623	24 6 40.4	3.770
19	15 51 50.21	2.4493	18 10 57.4	10.720	19	17 57 45.58	2.7669	24 10 21.1	3.585
20	15 54 17.39	2.4570	18 21 37.4	10.615	20	18 0 31.60	2.7699	24 13 50.7	3.400
21	15 56 45.05	2.4648	18 32 11.1	10.508	21	18 3 17.83	2.7734	24 17 9.2	3.213
22	15 59 13.18	2.4727	18 42 38.3	10.399	22	18 6 4.27	2.7767	24 20 16.4	3.025
23	16 1 41.78	2.4807	18 52 58.9	10.288	23	18 8 50.91	2.7799	24 23 12.2	2.836
24	16 4 10.86	2.4886	S. 19° 3' 12.8"	10.175	24	18 11 37.74	2.7831	S. 24° 25' 56.8"	2.647

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
TUESDAY 9.					THURSDAY 11.				
0	18 <sup>h</sup> 11 <sup>m</sup> 37.74 <sup>s</sup>	2.7819	S. 24° 25' 56.8"	2.647	0	20 <sup>h</sup> 24 <sup>m</sup> 50.89 <sup>s</sup>	2.6960	S. 22° 51' 30.9"	6.380
1	18 14 24.74	2.7847	24 28 29.9	2.456	1	20 27 32.47	2.6900	22 45 12.2	6.545
2	18 17 11.90	2.7873	24 30 51.5	2.265	2	20 30 13.69	2.6840	22 38 34.5	6.710
3	18 19 59.21	2.7897	24 33 1.7	2.074	3	20 32 54.55	2.6778	22 31 47.0	6.873
4	18 22 46.66	2.7920	24 35 0.4	1.882	4	20 35 35.03	2.6715	22 24 49.8	7.034
5	18 25 34.24	2.7940	24 36 47.5	1.688	5	20 38 15.12	2.6650	22 17 43.0	7.193
6	18 28 21.94	2.7958	24 38 22.9	1.494	6	20 40 54.81	2.6584	22 10 26.8	7.350
7	18 31 9.74	2.7974	24 39 46.7	1.300	7	20 43 34.10	2.6517	22 3 1.2	7.505
8	18 33 57.63	2.7988	24 40 58.9	1.106	8	20 46 13.00	2.6450	21 55 26.3	7.658
9	18 36 45.60	2.8000	24 41 59.5	0.912	9	20 48 51.50	2.6382	21 47 42.2	7.810
10	18 39 33.64	2.8010	24 42 48.4	0.718	10	20 51 29.58	2.6312	21 39 49.1	7.960
11	18 42 21.73	2.8018	24 43 25.5	0.520	11	20 54 7.23	2.6240	21 31 47.0	8.108
12	18 45 9.87	2.8024	24 43 50.8	0.325	12	20 56 44.46	2.6169	21 23 36.1	8.254
13	18 47 58.04	2.8029	24 44 4.4	-0.130	13	20 59 21.26	2.6097	21 15 16.5	8.399
14	18 50 46.23	2.8032	24 44 6.3	+0.065	14	21 1 57.62	2.6025	21 6 48.3	8.542
15	18 53 34.42	2.8033	24 43 56.6	0.260	15	21 4 33.55	2.5952	20 58 11.5	8.683
16	18 56 22.62	2.8031	24 43 35.1	0.456	16	21 7 9.04	2.5878	20 49 26.3	8.822
17	18 59 10.79	2.8027	24 43 1.8	0.652	17	21 9 44.08	2.5803	20 40 32.9	8.958
18	19 1 58.93	2.8021	24 42 16.7	0.848	18	21 12 18.67	2.5728	20 31 31.4	9.093
19	19 4 47.03	2.8012	24 41 19.9	1.044	19	21 14 52.81	2.5652	20 22 21.9	9.226
20	19 7 35.07	2.8001	24 40 11.4	1.239	20	21 17 26.49	2.5575	20 13 4.4	9.357
21	19 10 23.05	2.7988	24 38 51.3	1.433	21	21 19 59.71	2.5498	20 3 39.1	9.486
22	19 13 10.95	2.7974	24 37 19.5	1.627	22	21 22 32.47	2.5422	19 54 6.1	9.613
23	19 15 58.75	2.7958	S. 24 35 36.1	1.821	23	21 25 4.77	2.5345	S. 19 44 25.6	9.737
WEDNESDAY 10.					FRIDAY 12.				
0	19 18 46.45	2.7940	S. 24 33 41.0	2.015	0	21 27 36.60	2.5267	S. 19 34 37.7	9.859
1	19 21 34.03	2.7920	24 31 34.3	2.207	1	21 30 7.97	2.5189	19 24 42.5	9.980
2	19 24 21.48	2.7896	24 29 16.1	2.399	2	21 32 38.87	2.5110	19 14 40.1	10.099
3	19 27 8.80	2.7874	24 26 46.4	2.591	3	21 35 9.29	2.5032	19 4 30.6	10.216
4	19 29 55.97	2.7848	24 24 5.2	2.782	4	21 37 39.24	2.4953	18 54 14.2	10.331
5	19 32 42.97	2.7819	24 21 12.6	2.972	5	21 40 8.72	2.4875	18 43 51.0	10.444
6	19 35 29.78	2.7788	24 18 8.6	3.161	6	21 42 37.73	2.4796	18 33 20.9	10.555
7	19 38 16.41	2.7757	24 14 53.3	3.349	7	21 45 6.26	2.4717	18 22 44.2	10.664
8	19 41 2.85	2.7724	24 11 26.7	3.537	8	21 47 34.32	2.4638	18 12 1.2	10.771
9	19 43 49.10	2.7689	24 7 48.9	3.724	9	21 50 1.91	2.4559	18 1 12.0	10.875
10	19 46 35.13	2.7652	24 3 59.9	3.910	10	21 52 29.02	2.4480	17 50 16.5	10.977
11	19 49 20.92	2.7612	23 59 59.8	4.095	11	21 54 55.66	2.4401	17 39 14.8	11.078
12	19 52 6.46	2.7570	23 55 48.6	4.278	12	21 57 21.82	2.4322	17 28 7.1	11.177
13	19 54 51.75	2.7528	23 51 26.4	4.460	13	21 59 47.51	2.4243	17 16 53.6	11.273
14	19 57 36.79	2.7485	23 46 53.4	4.641	14	22 2 12.73	2.4163	17 5 34.4	11.368
15	20 0 21.57	2.7440	23 42 9.5	4.822	15	22 4 37.47	2.4083	16 54 9.5	11.461
16	20 3 6.07	2.7393	23 37 14.8	5.001	16	22 7 1.74	2.4004	16 42 39.1	11.552
17	20 5 50.27	2.7344	23 32 9.5	5.178	17	22 9 25.54	2.3926	16 31 3.4	11.641
18	20 8 34.18	2.7293	23 26 53.6	5.353	18	22 11 48.87	2.3849	16 19 22.3	11.728
19	20 11 17.79	2.7241	23 21 27.1	5.528	19	22 14 11.73	2.3779	16 7 36.1	11.812
20	20 14 1.07	2.7187	23 15 50.2	5.701	20	22 16 34.13	2.3695	15 55 44.9	11.894
21	20 16 44.03	2.7133	23 10 2.9	5.873	21	22 18 56.07	2.3617	15 43 48.8	11.975
22	20 19 26.66	2.7077	23 4 5.3	6.044	22	22 21 17.54	2.3540	15 31 47.9	12.054
23	20 22 8.95	2.7019	22 57 57.6	6.213	23	22 23 38.55	2.3463	15 19 42.3	12.131
24	20 24 50.89	2.6960	S. 22 51 39.9	6.380	24	22 25 59.11	2.3388	S. 15 7 32.2	12.206

## GREENWICH MEAN TIME

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SATURDAY 13.					MONDAY 15.				
0	22 25 59.11	2.3388	S. 15° 7' 32.2"	12.906	0	0 10 35.12	2.0468	S. 4° 27' 40.4"	13.871
1	22 28 19.21	2.3319	14 55 17.7	12.979	1	0 12 37.80	2.0425	4 13 48.1	13.871
2	22 30 38.86	2.3237	14 42 58.8	12.351	2	0 14 40.23	2.0383	3 59 55.9	13.870
3	22 32 58.05	2.3162	14 30 35.5	12.422	3	0 16 42.40	2.0342	3 46 3.7	13.869
4	22 35 16.80	2.3088	14 18 8.1	12.490	4	0 18 44.33	2.0302	3 32 11.6	13.866
5	22 37 35.11	2.3014	14 5 36.8	12.555	5	0 20 46.03	2.0263	3 18 19.8	13.862
6	22 39 52.97	2.2940	13 53 1.7	12.617	6	0 22 47.50	2.0225	3 4 28.2	13.858
7	22 42 10.39	2.2867	13 40 22.8	12.679	7	0 24 48.74	2.0188	2 50 36.9	13.852
8	22 44 27.38	2.2795	13 27 40.2	12.741	8	0 26 49.76	2.0152	2 36 46.1	13.844
9	22 46 43.94	2.2723	13 14 53.9	12.801	9	0 28 50.56	2.0116	2 22 55.7	13.836
10	22 49 0.07	2.2652	13 2 4.1	12.858	10	0 30 51.14	2.0080	2 9 5.8	13.827
11	22 51 15.77	2.2582	12 49 11.0	12.912	11	0 32 51.52	2.0046	1 55 16.5	13.818
12	22 53 31.06	2.2512	12 36 14.8	12.964	12	0 34 51.71	2.0013	1 41 27.7	13.807
13	22 55 45.92	2.2442	12 23 15.5	13.016	13	0 36 51.69	1.9981	1 27 39.7	13.794
14	22 58 0.37	2.2372	12 10 13.0	13.067	14	0 38 51.48	1.9948	1 13 52.5	13.781
15	23 0 14.41	2.2304	11 57 7.5	13.116	15	0 40 51.08	1.9917	1 0 6.0	13.767
16	23 2 28.04	2.2236	11 43 59.1	13.163	16	0 42 50.50	1.9888	0 46 20.4	13.759
17	23 4 41.27	2.2172	11 30 48.0	13.207	17	0 44 49.74	1.9859	0 32 35.8	13.736
18	23 6 54.10	2.2106	11 17 34.4	13.249	18	0 46 48.81	1.9830	0 18 52.2	13.719
19	23 9 6.54	2.2040	11 4 18.2	13.291	19	0 48 47.71	1.9802	S. 0 5 9.6	13.702
20	23 11 18.59	2.1975	10 50 59.5	13.332	20	0 50 46.44	1.9775	N. 0 8 31.9	13.683
21	23 13 30.24	2.1910	10 37 38.4	13.371	21	0 52 45.01	1.9748	0 22 12.2	13.662
22	23 15 41.51	2.1847	10 24 15.0	13.408	22	0 54 43.43	1.9723	0 35 51.3	13.641
23	23 17 52.41	2.1785	S. 10 10 49.5	13.443	23	0 56 41.70	1.9698	N. 0 49 29.1	13.620
SUNDAY 14.					TUESDAY 16.				
0	23 20 2.93	2.1723	S. 9 57 21.9	13.477	0	0 58 39.82	1.9675	N. 1 3 5.7	13.599
1	23 22 13.08	2.1669	9 43 52.3	13.509	1	1 0 37.80	1.9652	1 16 40.9	13.576
2	23 24 22.87	2.1609	9 30 20.9	13.539	2	1 2 35.65	1.9630	1 30 14.6	13.551
3	23 26 32.29	2.1540	9 16 47.6	13.569	3	1 4 33.36	1.9608	1 43 46.9	13.526
4	23 28 41.36	2.1482	9 3 12.6	13.597	4	1 6 30.94	1.9587	1 57 17.7	13.500
5	23 30 50.08	2.1423	8 49 36.0	13.624	5	1 8 28.40	1.9567	2 10 46.9	13.473
6	23 32 58.45	2.1365	8 35 57.8	13.649	6	1 10 25.75	1.9548	2 24 14.4	13.445
7	23 35 6.47	2.1308	8 22 18.2	13.672	7	1 12 22.98	1.9529	2 37 40.3	13.417
8	23 37 14.16	2.1253	8 8 37.2	13.694	8	1 14 20.10	1.9512	2 51 4.5	13.388
9	23 39 21.52	2.1198	7 54 54.9	13.715	9	1 16 17.12	1.9495	3 4 26.9	13.358
10	23 41 28.55	2.1144	7 41 11.4	13.734	10	1 18 14.04	1.9478	3 17 47.5	13.327
11	23 43 35.26	2.1090	7 27 26.8	13.752	11	1 20 10.86	1.9462	3 31 6.2	13.296
12	23 45 41.64	2.1037	7 13 41.2	13.769	12	1 22 7.59	1.9447	3 44 23.1	13.264
13	23 47 47.71	2.0985	6 59 54.6	13.785	13	1 24 4.23	1.9433	3 57 38.0	13.231
14	23 49 53.47	2.0934	6 46 7.1	13.799	14	1 26 0.79	1.9420	4 10 50.8	13.197
15	23 51 58.93	2.0883	6 32 18.8	13.811	15	1 27 57.27	1.9407	4 24 1.6	13.163
16	23 54 4.08	2.0833	6 18 29.8	13.822	16	1 29 53.67	1.9396	4 37 10.3	13.128
17	23 56 8.94	2.0786	6 4 40.2	13.833	17	1 31 50.01	1.9385	4 50 16.9	13.092
18	23 58 13.52	2.0738	5 50 49.9	13.843	18	1 33 46.29	1.9373	5 3 21.3	13.054
19	0 0 17.81	2.0691	5 36 59.1	13.850	19	1 35 42.50	1.9363	5 16 23.4	13.017
20	0 2 21.82	2.0643	5 23 7.9	13.856	20	1 37 38.66	1.9355	5 29 23.3	12.979
21	0 4 25.54	2.0597	5 9 16.4	13.861	21	1 39 34.76	1.9346	5 42 20.9	12.940
22	0 6 28.99	2.0553	4 55 24.6	13.865	22	1 41 30.81	1.9338	5 55 16.1	12.900
23	0 8 32.18	2.0510	4 41 32.6	13.869	23	1 43 26.82	1.9331	6 8 8.9	12.859
24	0 10 35.12	2.0468	S. 4 27 40.4	13.871	24	1 45 22.79	1.9325	N. 6 20 59.2	12.818



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
WEDNESDAY 17.					FRIDAY 19.				
0	1 45 22.79	1.9325	N. 6° 20' 59.2"	12.818	0	3 18 33.52	1.9706	N. 15° 36' 6.1"	10.064
1	1 47 18.72	1.9319	6 33 47.0	12.776	1	3 20 31.81	1.9725	15 46 7.8	9.992
2	1 49 14.62	1.9314	6 46 32.3	12.734	2	3 22 30.22	1.9745	15 56 5.1	9.919
3	1 51 10.49	1.9310	6 59 15.1	12.691	3	3 24 28.75	1.9765	16 5 58.0	9.845
4	1 53 6.34	1.9306	7 11 55.2	12.646	4	3 26 27.40	1.9785	16 15 46.4	9.770
5	1 55 2.17	1.9302	7 24 32.6	12.602	5	3 28 26.18	1.9806	16 25 30.3	9.695
6	1 56 57.97	1.9299	7 37 7.4	12.557	6	3 30 25.08	1.9827	16 35 9.8	9.620
7	1 58 53.76	1.9296	7 49 39.4	12.511	7	3 32 24.11	1.9848	16 44 44.7	9.543
8	2 0 49.55	1.9297	8 2 8.6	12.465	8	3 34 23.27	1.9871	16 54 14.9	9.465
9	2 2 45.33	1.9297	8 14 35.1	12.418	9	3 36 22.57	1.9893	17 3 40.5	9.387
10	2 4 41.11	1.9297	8 26 58.7	12.369	10	3 38 22.00	1.9915	17 13 1.4	9.309
11	2 6 36.89	1.9297	8 39 19.3	12.319	11	3 40 21.56	1.9938	17 22 17.6	9.231
12	2 8 32.68	1.9298	8 51 37.0	12.270	12	3 42 21.26	1.9962	17 31 29.1	9.159
13	2 10 28.48	1.9300	9 3 51.7	12.220	13	3 44 21.10	1.9985	17 40 35.8	9.071
14	2 12 24.29	1.9303	9 16 3.4	12.169	14	3 46 21.08	2.0008	17 49 37.6	8.990
15	2 14 20.12	1.9307	9 28 12.0	12.118	15	3 48 21.20	2.0032	17 58 34.6	8.909
16	2 16 15.97	1.9310	9 40 17.5	12.066	16	3 50 21.46	2.0055	18 7 26.7	8.827
17	2 18 11.85	1.9315	9 52 19.9	12.014	17	3 52 21.87	2.0080	18 16 13.8	8.744
18	2 20 7.75	1.9319	10 4 19.1	11.960	18	3 54 22.43	2.0105	18 24 56.0	8.661
19	2 22 3.68	1.9325	10 16 15.1	11.906	19	3 56 23.14	2.0129	18 33 33.2	8.578
20	2 23 59.65	1.9330	10 28 7.8	11.851	20	3 58 23.99	2.0153	18 42 5.3	8.494
21	2 25 55.65	1.9337	10 39 57.2	11.796	21	4 0 24.98	2.0177	18 50 32.4	8.410
22	2 27 51.70	1.9345	10 51 43.3	11.740	22	4 2 26.12	2.0202	18 58 54.4	8.324
23	2 29 47.79	1.9352	N. 11° 3 26.0	11.684	23	4 4 27.42	2.0228	N. 19° 7 11.2	8.237
THURSDAY 18.					SATURDAY 20.				
0	2 31 43.93	1.9360	N. 11° 15 5.3	11.627	0	4 6 28.87	2.0253	N. 19° 15 22.7	8.149
1	2 33 40.12	1.9368	11 26 41.2	11.568	1	4 8 30.47	2.0278	19 23 29.0	8.062
2	2 35 36.36	1.9378	11 38 13.5	11.509	2	4 10 32.22	2.0304	19 31 30.1	7.975
3	2 37 32.66	1.9388	11 49 42.3	11.451	3	4 12 34.13	2.0330	19 39 26.0	7.887
4	2 39 29.02	1.9398	12 1 7.6	11.392	4	4 14 36.20	2.0356	19 47 16.5	7.797
5	2 41 25.45	1.9410	12 12 29.3	11.331	5	4 16 38.42	2.0382	19 55 1.6	7.707
6	2 43 21.95	1.9422	12 23 47.3	11.269	6	4 18 40.79	2.0408	20 2 41.3	7.617
7	2 45 18.51	1.9433	12 35 1.6	11.208	7	4 20 43.32	2.0435	20 10 15.6	7.526
8	2 47 15.15	1.9444	12 46 12.2	11.146	8	4 22 46.01	2.0461	20 17 44.4	7.434
9	2 49 11.86	1.9457	12 57 19.1	11.084	9	4 24 48.86	2.0487	20 25 7.7	7.342
10	2 51 8.65	1.9471	13 8 22.2	11.020	10	4 26 51.86	2.0513	20 32 25.5	7.250
11	2 53 5.52	1.9485	13 19 21.4	10.955	11	4 28 55.02	2.0539	20 39 37.7	7.156
12	2 55 2.48	1.9500	13 30 16.8	10.890	12	4 30 58.33	2.0565	20 46 44.2	7.063
13	2 56 59.53	1.9515	13 41 8.3	10.825	13	4 33 1.80	2.0591	20 53 45.1	6.969
14	2 58 56.67	1.9530	13 51 55.8	10.760	14	4 35 5.43	2.0617	21 0 40.4	6.875
15	3 0 53.89	1.9545	14 2 39.4	10.694	15	4 37 9.22	2.0643	21 7 30.0	6.779
16	3 2 51.21	1.9563	14 13 19.0	10.626	16	4 39 13.16	2.0670	21 14 13.8	6.682
17	3 4 48.63	1.9578	14 23 54.5	10.557	17	4 41 17.26	2.0696	21 20 51.8	6.585
18	3 6 46.15	1.9595	14 34 25.8	10.488	18	4 43 21.51	2.0722	21 27 24.0	6.489
19	3 8 43.77	1.9612	14 44 53.0	10.419	19	4 45 25.92	2.0747	21 33 50.4	6.391
20	3 10 41.50	1.9630	14 55 16.1	10.350	20	4 47 30.48	2.0773	21 40 10.9	6.292
21	3 12 39.34	1.9648	15 5 35.0	10.280	21	4 49 35.20	2.0799	21 46 25.4	6.193
22	3 14 37.28	1.9667	15 15 49.7	10.209	22	4 51 40.08	2.0826	21 52 34.0	6.093
23	3 16 35.34	1.9687	15 26 0.1	10.137	23	4 53 45.11	2.0852	21 58 36.6	5.993
24	3 18 33.52	1.9706	N. 15° 36 6.1	10.064	24	4 55 50.28	2.0877	N. 22° 4 33.3	5.893

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SUNDAY 21.					TUESDAY 23.				
0	4 55 50.28	2.0877	N.22° 4' 33.3"	5.893	0	6 38 26.55	2.1725	N.24° 43' 13.1"	0.579
1	4 57 55.61	2.0909	22 10 23.9	5.793	1	6 40 36.92	2.1739	24 43 44.3	0.461
2	5 0 1.09	2.0937	22 16 8.4	5.692	2	6 42 47.32	2.1737	24 44 8.5	0.344
3	5 2 6.72	2.0959	22 21 46.9	5.590	3	6 44 57.75	2.1742	24 44 25.6	0.226
4	5 4 12.50	2.0977	22 27 19.2	5.487	4	6 47 8.21	2.1747	24 44 35.6	+0.108
5	5 6 18.43	2.1001	22 32 45.3	5.384	5	6 49 18.70	2.1752	24 44 38.5	-0.010
6	5 8 24.50	2.1025	22 38 5.3	5.281	6	6 51 29.22	2.1755	24 44 34.4	0.198
7	5 10 30.72	2.1048	22 43 19.0	5.177	7	6 53 39.76	2.1758	24 44 23.2	0.246
8	5 12 37.08	2.1073	22 48 26.5	5.073	8	6 55 50.31	2.1760	24 44 4.9	0.364
9	5 14 43.59	2.1097	22 53 27.7	4.968	9	6 58 0.86	2.1762	24 43 39.5	0.462
10	5 16 50.24	2.1120	22 58 22.6	4.863	10	7 0 11.43	2.1763	24 43 7.0	0.601
11	5 18 57.03	2.1143	23 3 11.2	4.757	11	7 2 22.01	2.1765	24 42 27.4	0.719
12	5 21 3.95	2.1165	23 7 53.4	4.650	12	7 4 32.58	2.1769	24 41 40.8	0.837
13	5 23 11.01	2.1188	23 12 20.2	4.543	13	7 6 43.15	2.1762	24 40 47.1	0.955
14	5 25 18.20	2.1210	23 16 58.6	4.436	14	7 8 53.72	2.1769	24 39 46.3	1.073
15	5 27 25.53	2.1233	23 21 21.5	4.328	15	7 11 4.28	2.1760	24 38 38.3	1.192
16	5 29 32.99	2.1255	23 25 37.9	4.219	16	7 13 14.83	2.1757	24 37 23.2	1.310
17	5 31 40.58	2.1276	23 29 47.8	4.111	17	7 15 25.36	2.1753	24 36 1.1	1.427
18	5 33 48.29	2.1297	23 33 51.3	4.003	18	7 17 35.87	2.1750	24 34 32.0	1.544
19	5 35 56.13	2.1317	23 37 48.2	3.893	19	7 19 46.36	2.1747	24 32 55.8	1.662
20	5 38 4.09	2.1337	23 41 38.5	3.783	20	7 21 56.83	2.1742	24 31 12.5	1.780
21	5 40 12.17	2.1357	23 45 22.2	3.673	21	7 24 7.26	2.1737	24 29 22.1	1.898
22	5 42 20.37	2.1377	23 48 59.3	3.563	22	7 26 17.66	2.1731	24 27 24.7	2.016
23	5 44 28.68	2.1396	N.23 52 29.7	3.459	23	7 28 28.02	2.1725	N.24 25 20.3	2.132
MONDAY 22.					WEDNESDAY 24.				
0	5 46 37.11	2.1415	N.23 55 53.5	3.341	0	7 30 38.35	2.1718	N.24 23 8.9	2.249
1	5 48 45.65	2.1433	23 59 10.6	3.229	1	7 32 48.64	2.1710	24 20 50.5	2.363
2	5 50 54.30	2.1451	24 2 20.9	3.117	2	7 34 58.87	2.1702	24 18 25.0	2.483
3	5 53 3.06	2.1468	24 5 24.5	3.004	3	7 37 9.05	2.1693	24 15 52.5	2.600
4	5 55 11.92	2.1485	24 8 21.4	2.892	4	7 39 19.18	2.1684	24 13 13.0	2.716
5	5 57 20.88	2.1502	24 11 11.5	2.779	5	7 41 29.25	2.1675	24 10 26.5	2.833
6	5 59 29.94	2.1518	24 13 54.8	2.665	6	7 43 39.27	2.1665	24 7 33.1	2.948
7	6 1 39.10	2.1534	24 16 31.3	2.551	7	7 45 49.23	2.1655	24 4 32.8	3.063
8	6 3 48.35	2.1549	24 19 0.9	2.437	8	7 47 59.12	2.1643	24 1 25.5	3.179
9	6 5 57.68	2.1563	24 21 23.7	2.323	9	7 50 8.93	2.1630	23 58 11.3	3.294
10	6 8 7.10	2.1578	24 23 39.6	2.208	10	7 52 18.67	2.1618	23 54 50.2	3.409
11	6 10 16.61	2.1593	24 25 48.6	2.094	11	7 54 28.34	2.1605	23 51 22.2	3.523
12	6 12 26.21	2.1607	24 27 50.8	1.980	12	7 56 37.93	2.1592	23 47 47.4	3.637
13	6 14 35.89	2.1620	24 29 46.1	1.864	13	7 58 47.44	2.1578	23 44 5.7	3.751
14	6 16 45.64	2.1631	24 31 34.4	1.747	14	8 0 56.86	2.1564	23 40 17.2	3.865
15	6 18 55.45	2.1642	24 33 15.7	1.631	15	8 3 6.20	2.1550	23 36 21.9	3.978
16	6 21 5.33	2.1653	24 34 50.1	1.515	16	8 5 15.45	2.1535	23 32 19.8	4.091
17	6 23 15.29	2.1664	24 36 17.5	1.399	17	8 7 24.61	2.1519	23 28 10.9	4.204
18	6 25 25.31	2.1675	24 37 37.9	1.282	18	8 9 33.67	2.1503	23 23 55.3	4.316
19	6 27 35.39	2.1685	24 38 51.3	1.165	19	8 11 42.64	2.1486	23 19 33.0	4.428
20	6 29 45.52	2.1694	24 39 57.7	1.049	20	8 13 51.50	2.1468	23 15 4.0	4.540
21	6 31 55.71	2.1703	24 40 57.1	0.932	21	8 16 0.26	2.1451	23 10 28.2	4.652
22	6 34 5.95	2.1710	24 41 49.5	0.814	22	8 18 8.92	2.1433	23 5 45.8	4.762
23	6 36 16.23	2.1717	24 42 34.8	0.696	23	8 20 17.47	2.1415	23 0 56.8	4.879
24	6 38 26.55	2.1725	N.24 43 13.1	0.579	24	8 22 25.90	2.1397	N.22 56 1.3	4.980

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
THURSDAY 25.					SATURDAY 27.				
0	8 22 25.90	2.1397	N.22° 56' 1.3	4.980	0	10 2 29.31	2.0947	N.17° 0' 34.9	9.591
1	8 24 34.22	2.1378	22 50 59.2	5.090	1	10 4 30.72	2.0922	16 50 57.1	9.670
2	8 26 42.43	2.1358	22 45 50.5	5.200	2	10 6 31.97	2.0197	16 41 14.6	9.748
3	8 28 50.52	2.1338	22 40 35.2	5.309	3	10 8 33.08	2.0172	16 31 27.3	9.826
4	8 30 58.49	2.1318	22 35 13.4	5.417	4	10 10 34.04	2.0148	16 21 35.4	9.904
5	8 33 6.34	2.1298	22 29 45.2	5.524	5	10 12 34.86	2.0125	16 11 38.9	9.981
6	8 35 14.07	2.1278	22 24 10.6	5.631	6	10 14 35.54	2.0101	16 1 37.7	10.057
7	8 37 21.67	2.1257	22 18 29.5	5.738	7	10 16 36.08	2.0077	15 51 32.0	10.139
8	8 39 29.14	2.1235	22 12 42.1	5.844	8	10 18 36.47	2.0053	15 41 21.9	10.206
9	8 41 36.48	2.1213	22 6 48.3	5.949	9	10 20 36.72	2.0030	15 31 7.3	10.280
10	8 43 43.69	2.1190	22 0 48.2	6.054	10	10 22 36.83	2.0007	15 20 48.3	10.353
11	8 45 50.76	2.1168	21 54 41.8	6.158	11	10 24 36.81	1.9985	15 10 25.0	10.425
12	8 47 57.70	2.1145	21 48 29.2	6.262	12	10 26 36.65	1.9963	14 59 57.3	10.497
13	8 50 4.50	2.1122	21 42 10.4	6.365	13	10 28 36.36	1.9940	14 49 25.4	10.567
14	8 52 11.16	2.1100	21 35 45.3	6.468	14	10 30 35.94	1.9918	14 38 49.3	10.637
15	8 54 17.69	2.1077	21 29 14.1	6.571	15	10 32 35.38	1.9897	14 28 9.0	10.708
16	8 56 24.08	2.1053	21 22 36.8	6.672	16	10 34 34.70	1.9876	14 17 24.6	10.778
17	8 58 30.32	2.1029	21 15 53.4	6.773	17	10 36 33.90	1.9855	14 6 36.1	10.848
18	9 0 36.42	2.1005	21 9 4.0	6.873	18	10 38 32.97	1.9834	13 55 43.6	10.909
19	9 2 42.37	2.0980	21 2 8.6	6.973	19	10 40 31.91	1.9813	13 44 47.1	10.974
20	9 4 48.18	2.0955	20 55 7.2	7.073	20	10 42 30.73	1.9793	13 33 46.7	11.039
21	9 6 53.84	2.0931	20 47 59.7	7.173	21	10 44 29.44	1.9774	13 22 42.4	11.104
22	9 8 59.36	2.0907	20 40 46.3	7.271	22	10 46 28.03	1.9755	13 11 34.3	11.167
23	9 11 4.73	2.0883	N.20 33 27.1	7.367	23	10 48 26.50	1.9736	N.13 0 22.4	11.230
FRIDAY 26.					SUNDAY 28.				
0	9 13 9.95	2.0858	N.20 26 2.2	7.464	0	10 50 24.86	1.9717	N.12 49 6.6	11.293
1	9 15 15.02	2.0833	20 18 31.5	7.560	1	10 52 23.11	1.9699	12 37 47.1	11.355
2	9 17 19.94	2.0808	20 10 55.0	7.657	2	10 54 21.25	1.9681	12 26 24.0	11.415
3	9 19 24.70	2.0782	20 3 12.6	7.753	3	10 56 19.29	1.9663	12 14 57.4	11.474
4	9 21 29.31	2.0757	19 55 24.5	7.848	4	10 58 17.22	1.9646	12 3 27.2	11.533
5	9 23 33.77	2.0732	19 47 30.9	7.941	5	11 0 15.05	1.9630	11 51 53.5	11.592
6	9 25 38.08	2.0706	19 39 31.8	8.033	6	11 2 12.78	1.9613	11 40 16.2	11.650
7	9 27 42.23	2.0680	19 31 27.1	8.125	7	11 4 10.41	1.9597	11 28 35.5	11.706
8	9 29 46.23	2.0653	19 23 16.8	8.217	8	11 6 7.95	1.9589	11 16 51.5	11.761
9	9 31 50.07	2.0628	19 15 1.0	8.308	9	11 8 5.40	1.9567	11 5 4.2	11.816
10	9 33 53.76	2.0603	19 6 39.8	8.398	10	11 10 2.76	1.9553	10 53 13.6	11.870
11	9 35 57.30	2.0577	18 58 13.2	8.488	11	11 12 0.04	1.9539	10 41 19.8	11.924
12	9 38 0.68	2.0552	18 49 41.2	8.577	12	11 13 57.23	1.9525	10 29 22.8	11.977
13	9 40 3.91	2.0525	18 41 3.9	8.665	13	11 15 54.34	1.9512	10 17 22.6	12.029
14	9 42 6.98	2.0500	18 32 21.4	8.753	14	11 17 51.38	1.9500	10 5 19.4	12.079
15	9 44 9.90	2.0475	18 23 33.6	8.840	15	11 19 48.34	1.9487	9 53 13.1	12.130
16	9 46 12.67	2.0449	18 14 40.6	8.926	16	11 21 45.23	1.9475	9 41 3.8	12.179
17	9 48 15.28	2.0423	18 5 42.5	9.011	17	11 23 42.05	1.9463	9 28 51.6	12.227
18	9 50 17.74	2.0398	17 56 39.2	9.096	18	11 25 38.80	1.9453	9 16 36.6	12.274
19	9 52 20.05	2.0372	17 47 30.9	9.180	19	11 27 35.49	1.9443	9 4 18.7	12.322
20	9 54 22.20	2.0346	17 38 17.6	9.264	20	11 29 32.12	1.9433	8 51 57.9	12.369
21	9 56 24.20	2.0320	17 28 59.3	9.346	21	11 31 28.70	1.9424	8 39 34.4	12.414
22	9 58 26.05	2.0295	17 19 36.1	9.428	22	11 33 25.22	1.9415	8 27 8.2	12.459
23	10 0 27.75	2.0271	17 10 8.0	9.510	23	11 35 21.69	1.9407	8 14 39.4	12.508
24	10 2 29.31	2.0247	N.17 0 34.9	9.591	24	11 37 18.11	1.9400	N. 8 2 8.0	12.545

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
MONDAY 29.					WEDNESDAY 31.				
0	11 <sup>h</sup> 37 <sup>m</sup> 18.11	1.9400	N. 8° 2' 8.0"	19.545	0	13 <sup>h</sup> 10 <sup>m</sup> 41.57	1.9767	S. 2° 33' 40.0"	13.612
1	11 39 14.49	1.9399	7 49 34.0	19.587	1	13 12 40.24	1.9792	2 47 16.7	13.613
2	11 41 10.82	1.9385	7 36 57.5	19.628	2	13 14 39.07	1.9817	3 0 53.5	13.613
3	11 43 7.12	1.9380	7 24 18.6	19.668	3	13 16 38.05	1.9843	3 14 30.2	13.611
4	11 45 3.38	1.9375	7 11 37.3	19.708	4	13 18 37.19	1.9870	3 28 6.8	13.608
5	11 46 59.62	1.9370	6 58 53.6	19.748	5	13 20 36.49	1.9897	3 41 43.1	13.603
6	11 48 55.83	1.9365	6 46 7.5	19.787	6	13 22 35.95	1.9925	3 55 19.1	13.598
7	11 50 52.01	1.9361	6 33 19.2	19.824	7	13 24 35.59	1.9955	4 8 54.8	13.593
8	11 52 48.17	1.9358	6 20 28.7	19.860	8	13 26 35.41	1.9985	4 22 30.2	13.586
9	11 54 44.32	1.9354	6 7 36.1	19.895	9	13 28 35.41	2.0015	4 36 5.2	13.578
10	11 56 40.46	1.9355	5 54 41.4	19.930	10	13 30 35.59	2.0046	4 49 39.6	13.569
11	11 58 36.59	1.9353	5 41 44.6	19.965	11	13 32 35.97	2.0078	5 3 13.4	13.559
12	12 0 32.70	1.9352	5 28 45.7	19.998	12	13 34 36.54	2.0111	5 16 46.7	13.549
13	12 2 28.81	1.9352	5 15 44.9	13.030	13	13 36 37.31	2.0145	5 30 19.3	13.537
14	12 4 24.93	1.9352	5 2 42.2	13.061	14	13 38 38.29	2.0180	5 43 51.1	13.523
15	12 6 21.05	1.9353	4 49 37.6	13.092	15	13 40 39.47	2.0216	5 57 22.0	13.508
16	12 8 17.18	1.9355	4 36 31.2	13.121	16	13 42 40.87	2.0251	6 10 52.0	13.493
17	12 10 13.32	1.9358	4 23 23.1	13.150	17	13 44 42.48	2.0287	6 24 21.1	13.477
18	12 12 9.48	1.9362	4 10 13.2	13.179	18	13 46 44.32	2.0325	6 37 49.2	13.460
19	12 14 5.66	1.9365	3 57 1.7	13.208	19	13 48 46.39	2.0363	6 51 16.2	13.442
20	12 16 1.86	1.9368	3 43 48.6	13.232	20	13 50 48.69	2.0402	7 4 42.0	13.422
21	12 17 58.09	1.9373	3 30 33.9	13.257	21	13 52 51.22	2.0442	7 18 6.7	13.401
22	12 19 54.35	1.9379	3 17 17.7	13.282	22	13 54 53.99	2.0482	7 31 30.1	13.378
23	12 21 50.65	1.9385	N. 3° 4' 0.1"	13.306	23	13 56 57.01	2.0523	S. 7° 44' 52.0"	13.354
TUESDAY 30.					THURSDAY, FEBRUARY 1.				
0	12 23 46.98	1.9392	N. 2° 50' 41.0"	13.339	0	13 59 0.28	2.0565	S. 7° 58' 12.5"	13.330
1	12 25 43.36	1.9400	2 37 20.6	13.351	PHASES OF THE MOON.				
2	12 27 39.79	1.9406	2 23 58.9	13.372					
3	12 29 36.27	1.9418	2 10 35.9	13.393					
4	12 31 32.81	1.9427	1 57 11.7	13.413					
5	12 33 29.40	1.9437	1 43 46.4	13.431	☾ Last Quarter, . . . <sup>d</sup> 3 <sup>h</sup> 9 59.2 ● New Moon, . . . 10 2 58.0 ☽ First Quarter, . . . 17 0 2.1 ○ Full Moon, . . . 25 5 14.6				
6	12 35 26.05	1.9447	1 30 20.1	13.448					
7	12 37 22.77	1.9459	1 16 52.7	13.465					
8	12 39 19.57	1.9472	1 3 24.3	13.481					
9	12 41 16.44	1.9485	0 49 54.9	13.496	☾ Perigee, . . . . . <sup>d</sup> 9 <sup>h</sup> 15.8 ☾ Apogee, . . . . . 22 11.7				
10	12 43 13.39	1.9498	0 36 24.7	13.510					
11	12 45 10.43	1.9513	0 22 53.7	13.524					
12	12 47 7.56	1.9528	N. 0° 9' 21.8"	13.537					
13	12 49 4.78	1.9544	S. 0° 4' 10.8"	13.548					
14	12 51 2.10	1.9560	0 17 44.0	13.558					
15	12 52 59.51	1.9577	0 31 17.7	13.568					
16	12 54 57.03	1.9596	0 44 52.0	13.577					
17	12 56 54.67	1.9615	0 58 26.9	13.585					
18	12 58 52.42	1.9635	1 12 2.2	13.593					
19	13 0 50.29	1.9655	1 25 37.9	13.598					
20	13 2 48.28	1.9675	1 39 13.9	13.603					
21	13 4 46.40	1.9697	1 52 50.2	13.607					
22	13 6 44.65	1.9720	2 6 26.7	13.609					
23	13 8 43.04	1.9743	2 20 3.3	13.611					
24	13 10 41.57	1.9767	S. 2° 33' 40.0"	13.612					

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
1	Pollux W.	50° 17' 49"	2884	51° 50' 28"	2873	53° 23' 22"	2882	54° 56' 30"	2849
	Jupiter W.	45° 27' 25"	2831	47° 1' 12"	2821	48° 35' 13"	2809	50° 9' 29"	2798
	Spica E.	40° 38' 23"	2937	39° 6' 51"	2931	37° 35' 11"	2925	36° 3' 24"	2921
	Venus E.	73° 9' 17"	3282	71° 44' 45"	3270	70° 19' 59"	3259	68° 55' 0"	3247
	Antares E.	86° 23' 28"	2889	84° 50' 55"	2878	83° 18' 8"	2867	81° 45' 7"	2856
	SUN E.	118° 18' 1"	3239	116° 52' 38"	3228	115° 27' 2"	3216	114° 1' 12"	3204
2	Pollux W.	62° 46' 10"	2786	64° 20' 56"	2773	65° 55' 59"	2759	67° 31' 21"	2745
	Jupiter W.	58° 4' 39"	2736	59° 40' 31"	2723	61° 16' 40"	2709	62° 53' 8"	2695
	Regulus W.	26° 55' 32"	2831	28° 29' 19"	2813	30° 3' 30"	2795	31° 38' 5"	2777
	Spica E.	28° 23' 18"	2909	26° 51' 11"	2912	25° 19' 7"	2918	23° 47' 11"	2926
	Venus E.	61° 46' 19"	3181	60° 19' 47"	3167	58° 52' 58"	3153	57° 25' 51"	3138
	Antares E.	73° 56' 22"	2797	72° 21' 50"	2784	70° 47' 1"	2772	69° 11' 56"	2758
	SUN E.	106° 48' 16"	3138	105° 20' 52"	3124	103° 53' 11"	3109	102° 25' 12"	3094
3	Pollux W.	75° 32' 55"	2671	77° 10' 14"	2656	78° 47' 53"	2640	80° 25' 54"	2624
	Jupiter W.	71° 0' 10"	2623	72° 38' 34"	2607	74° 17' 19"	2591	75° 56' 26"	2575
	Regulus W.	39° 36' 47"	2689	41° 13' 41"	2672	42° 50' 58"	2655	44° 28' 38"	2638
	Venus E.	50° 5' 42"	3058	48° 36' 41"	3042	47° 7' 20"	3025	45° 37' 38"	3008
	Antares E.	61° 12' 1"	2669	59° 35' 6"	2675	57° 57' 52"	2660	56° 20' 18"	2646
	SUN E.	95° 0' 38"	3015	93° 30' 44"	2998	92° 0' 29"	2981	90° 29' 53"	2965
4	Pollux W.	88° 41' 32"	2540	90° 21' 49"	2524	92° 2' 29"	2507	93° 43' 33"	2489
	Jupiter W.	84° 17' 35"	2493	85° 58' 58"	2476	87° 40' 45"	2459	89° 22' 56"	2442
	Regulus W.	52° 42' 56"	2549	54° 23' 1"	2532	56° 3' 30"	2514	57° 44' 24"	2495
	Venus E.	38° 3' 39"	2918	36° 31' 43"	2899	34° 59' 23"	2881	33° 26' 40"	2862
	Antares E.	48° 7' 29"	2571	46° 27' 54"	2556	44° 47' 59"	2541	43° 7' 43"	2527
	SUN E.	82° 51' 24"	2875	81° 18' 33"	2857	79° 45' 19"	2838	78° 11' 41"	2819
5	Pollux W.	102° 15' 3"	2402	103° 58' 35"	2384	105° 42' 33"	2366	107° 26' 56"	2349
	Jupiter W.	98° 0' 2"	2355	99° 44' 42"	2337	101° 29' 48"	2320	103° 15' 19"	2302
	Regulus W.	66° 15' 17"	2405	67° 58' 45"	2387	69° 42' 38"	2369	71° 26' 57"	2351
	Antares E.	34° 41' 37"	2462	32° 59' 30"	2451	31° 17' 9"	2442	29° 34' 34"	2435
	SUN E.	70° 17' 21"	2725	68° 41' 14"	2706	67° 4' 42"	2687	65° 27' 45"	2669
6	Regulus W.	80° 14' 59"	2264	82° 1' 52"	2247	83° 49' 10"	2231	85° 36' 52"	2214
	Spica W.	26° 42' 41"	2387	28° 26' 34"	2357	30° 11' 10"	2328	31° 56' 29"	2300
	SUN E.	57° 16' 42"	2577	55° 37' 15"	2559	53° 57' 23"	2541	52° 17' 7"	2524
7	Regulus W.	94° 41' 20"	2138	96° 31' 21"	2124	98° 21' 44"	2111	100° 12' 27"	2098
	Spica W.	40° 52' 8"	2190	42° 40' 50"	2172	44° 30' 0"	2155	46° 19' 36"	2138
	SUN E.	43° 49' 59"	2445	42° 7' 28"	2430	40° 24' 36"	2416	38° 41' 24"	2403
12	SUN W.	26° 42' 50"	2429	28° 25' 43"	2443	30° 8' 17"	2457	31° 50' 31"	2472
	α Arietis E.	78° 49' 11"	2222	77° 1' 31"	2247	75° 14' 14"	2265	73° 27' 23"	2283
	Aldebaran E.	109° 21' 50"	2115	107° 31' 13"	2128	105° 40' 57"	2143	103° 51' 3"	2157
13	SUN W.	40° 16' 8"	2556	41° 56' 4"	2574	43° 35' 34"	2593	45° 14' 39"	2619
	α Arietis E.	64° 39' 59"	2383	62° 56' 0"	2406	61° 12' 34"	2429	59° 29' 41"	2453
	Aldebaran E.	94° 47' 24"	2239	92° 59' 55"	2257	91° 12' 52"	2274	89° 26' 15"	2293
14	SUN W.	53° 23' 25"	2712	54° 59' 49"	2732	56° 35' 47"	2752	58° 11' 18"	2772
	Mars W.	24° 25' 17"	2671	26° 2' 36"	2687	27° 39' 33"	2703	29° 16' 9"	2720
	α Arietis E.	51° 4' 14"	2589	49° 25' 4"	2620	47° 46' 36"	2652	46° 8' 51"	2685
	Aldebaran E.	80° 39' 54"	2387	78° 56' 0"	2406	77° 12' 34"	2425	75° 29' 35"	2445

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIb.	P. L. of Diff.	XXIb.	P. L. of Diff.
1	Pollux W.	56 29 54	2838	58 3 33	2825	59 37 29	2812	61 11 41	2799
	Jupiter W.	51 43 59	2787	53 18 44	2774	54 53 46	2762	56 29 4	2749
	Spica E.	34 31 32	2916	32 59 34	2913	31 27 32	2910	29 55 26	2909
	Venus E.	67 29 46	3235	66 4 18	3221	64 38 34	3209	63 12 35	3194
	Antares E.	80 11 52	2845	78 38 22	2834	77 4 38	2821	75 30 38	2809
	SUN E.	112 35 7	3192	111 8 48	3178	109 42 13	3166	108 15 23	3152
2	Pollux W.	69 7 1	2731	70 43 0	2716	72 19 18	2701	73 55 56	2686
	Jupiter W.	64 29 54	2681	66 6 59	2667	67 44 23	2653	69 22 6	2638
	Regulus W.	33 13 3	2760	34 48 24	2741	36 24 9	2725	38 0 16	2707
	Spica E.	22 15 28	2943	20 44 4	2964	19 13 6	2994	17 42 46	3038
	Venus E.	55 58 27	3122	54 30 44	3107	53 2 43	3091	51 34 22	3075
	Antares E.	67 36 33	2745	66 0 53	2731	64 24 54	2717	62 48 37	2703
3	SUN E.	100 56 55	3078	99 28 19	3064	97 59 25	3047	96 30 11	3032
	Pollux W.	82 4 17	2607	83 43 2	2591	85 22 9	2574	87 1 39	2558
	Jupiter W.	77 35 55	2559	79 15 46	2543	80 55 59	2527	82 36 85	2510
	Regulus W.	46 6 42	2690	47 45 10	2603	49 24 1	2585	51 3 16	2567
	Venus E.	44 7 35	2990	42 37 10	2972	41 6 22	2954	39 35 12	2936
	Antares E.	54 42 25	2631	53 4 12	2615	51 25 38	2601	49 46 44	2585
4	SUN E.	88 58 56	2947	87 27 37	2929	85 55 55	2912	84 23 51	2894
	Pollux W.	95 25 2	2479	97 6 55	2454	98 49 13	2436	100 31 56	2419
	Jupiter W.	91 5 31	2494	92 48 32	2407	94 31 57	2389	96 15 47	2379
	Regulus W.	59 25 44	2477	61 7 29	2460	62 49 39	2441	64 32 15	2423
	Venus E.	31 53 33	2844	30 20 2	2825	28 46 6	2806	27 11 46	2786
	Antares E.	41 27 8	2513	39 46 13	2499	38 4 59	2487	36 23 27	2474
5	SUN E.	76 37 38	2801	75 3 11	2782	73 28 19	2763	71 53 2	2744
	Pollux W.	109 11 44	2332	110 56 57	2315	112 42 35	2298	114 28 38	2281
	Jupiter W.	105 1 16	2285	106 47 38	2267	108 34 26	2250	110 21 39	2233
	Regulus W.	73 11 42	2333	74 56 53	2316	76 42 29	2298	78 28 31	2281
	Antares E.	27 51 49	2429	26 8 55	2426	24 25 58	2427	22 43 2	2433
	SUN E.	63 50 23	2649	62 12 35	2631	60 34 22	2612	58 55 44	2596
6	Regulus W.	87 24 59	2198	89 13 30	2182	91 2 24	2167	92 51 41	2153
	Spica W.	33 42 28	2275	35 29 4	2253	37 16 13	2231	39 3 55	2210
	SUN E.	50 36 27	2507	48 55 23	2491	47 13 57	2475	45 32 9	2460
7	Regulus W.	102 3 29	2068	103 54 50	2073	105 46 30	2063	107 38 26	2052
	Spica W.	48 9 37	2123	50 0 1	2108	51 50 48	2094	53 41 56	2081
	SUN E.	36 57 54	2390	35 14 5	2379	33 30 0	2368	31 45 39	2358
12	SUN W.	33 32 24	2487	35 13 55	2504	36 55 3	2520	38 35 48	2538
	α Arietis E.	71 40 58	2301	69 55 0	2290	68 9 30	2340	66 24 29	2362
	Aldebaran E.	102 1 31	2172	100 12 22	2189	98 23 38	2206	96 35 19	2223
13	SUN W.	46 53 17	2639	48 31 29	2652	50 9 14	2671	51 46 33	2691
	α Arietis E.	57 47 22	2479	56 5 39	2505	54 24 33	2532	52 44 4	2560
	Aldebaran E.	87 40 5	2311	85 54 21	2330	84 9 5	2348	82 24 16	2367
14	SUN W.	59 46 22	2793	61 20 59	2815	62 55 8	2835	64 28 50	2855
	Mars W.	30 52 22	2738	32 28 11	2756	34 3 37	2774	35 38 39	2792
	α Arietis E.	44 31 51	2720	42 55 38	2757	41 20 14	2796	39 45 41	2838
	Aldebaran E.	73 47 4	2464	72 5 0	2484	70 23 24	2503	68 42 15	2522

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Diff.	III <sup>h</sup> .	P. L. of Diff.	VI <sup>h</sup> .	P. L. of Diff.	IX <sup>h</sup> .	P. L. of Diff.
15.	SUN W.	66° 2' 6"	2876	67° 34' 56"	2885	69° 7' 21"	2916	70° 39' 20"	2936
	Mars W.	37 13 17	2811	38 47 31	2829	40 21 21	2848	41 54 46	2868
	Fomalhaut W.	32 0 9	3198	33 26 20	3161	34 53 16	3130	36 20 49	3106
	α Arietis E.	38 12 2	2882	36 39 20	2931	35 7 40	2982	33 37 5	3039
	Aldebaran E.	67 1 32	2541	65 21 16	2561	63 41 27	2580	62 2 4	2599
16	SUN W.	78 13 1	3033	79 42 33	3052	81 11 42	3070	82 40 28	3088
	Mars W.	49 35 53	2959	51 6 57	2977	52 37 39	2994	54 7 59	3011
	Fomalhaut W.	43 44 7	3047	45 13 22	3044	46 42 40	3043	48 12 0	3042
	Aldebaran E.	53 51 35	2691	52 14 43	2710	50 38 16	2738	49 2 13	2745
	Pollux E.	98 1 43	2684	96 24 41	2701	94 48 2	2717	93 11 45	2735
	Jupiter E.	100 51 29	2632	99 13 18	2649	97 35 29	2666	95 58 3	2682
17	SUN W.	89 58 58	3173	91 25 39	3189	92 52 1	3204	94 18 5	3220
	Mars W.	61 34 27	3093	63 2 45	3108	64 30 45	3123	65 58 27	3138
	Fomalhaut W.	55 38 11	3060	57 7 10	3065	58 36 3	3071	60 4 48	3078
	α Pegasi E.	41 48 2	3846	43 2 17	3799	44 17 20	3760	45 33 4	3735
	Aldebaran E.	41 7 39	2830	39 33 50	2847	38 0 23	2862	36 27 16	2880
	Pollux E.	85 15 43	2812	83 41 31	2827	82 7 38	2842	80 34 4	2855
	Jupiter E.	87 56 14	2760	86 20 53	2773	84 45 50	2788	83 11 6	2801
18	SUN W.	101 24 7	3289	102 48 31	3301	104 12 41	3313	105 36 37	3325
	Mars W.	73 12 42	3204	74 38 46	3216	76 4 36	3226	77 30 12	3240
	Fomalhaut W.	67 26 31	3112	68 54 26	3119	70 22 12	3127	71 49 49	3133
	α Pegasi W.	51 59 36	3805	53 18 5	3588	54 36 52	3575	55 55 54	3562
	Pollux E.	72 50 29	2919	71 18 34	2931	69 46 54	2942	68 15 28	2952
	Jupiter E.	75 21 43	2864	73 48 38	2875	72 15 47	2887	70 43 11	2897
	Regulus E.	108 51 1	2921	107 19 9	2931	105 47 30	2949	104 16 5	2953
19	SUN W.	112 33 3	3377	113 55 46	3386	115 18 18	3394	116 40 41	3403
	Mars W.	84 35 3	3289	85 59 27	3297	87 23 42	3306	88 47 47	3313
	Fomalhaut W.	79 5 50	3168	80 32 37	3174	81 59 17	3181	83 25 49	3187
	α Pegasi W.	62 33 59	3520	63 54 1	3514	65 14 10	3509	66 34 24	3505
	Pollux E.	60 41 31	3001	59 11 19	3009	57 41 18	3018	56 11 27	3025
	Jupiter E.	63 3 19	2943	61 31 55	2951	60 0 41	2959	58 29 37	2967
	Regulus E.	96 42 6	2999	95 11 52	3007	93 41 48	3014	92 11 53	3022
20	Mars W.	95 46 6	3346	97 9 24	3351	98 32 36	3356	99 55 43	3361
	Fomalhaut W.	90 36 43	3215	92 2 34	3220	93 28 19	3226	94 53 57	3231
	α Pegasi W.	73 16 33	3491	74 37 7	3489	75 57 43	3488	77 18 20	3488
	Pollux E.	48 44 27	3059	47 15 27	3065	45 46 35	3070	44 17 49	3076
	Jupiter E.	50 56 26	2997	49 26 10	3002	47 56 0	3008	46 25 57	3012
	Regulus E.	84 44 23	3052	83 15 14	3057	81 46 12	3061	80 17 15	3066
21	α Pegasi W.	84 1 37	3486	85 22 17	3486	86 42 57	3487	88 3 36	3487
	α Arietis W.	40 29 26	3367	41 52 20	3352	43 15 31	3339	44 38 57	3327
	Pollux E.	36 55 33	3100	35 27 23	3104	33 59 18	3108	32 31 18	3113
	Jupiter E.	38 56 54	3029	37 27 17	3032	35 57 44	3034	34 28 14	3037
	Regulus E.	72 53 41	3082	71 25 9	3084	69 56 40	3086	68 28 13	3088
22	α Pegasi W.	94 46 39	3493	96 7 11	3495	97 27 41	3497	98 48 8	3500
	α Arietis W.	51 39 21	3277	53 3 59	3269	54 28 47	3261	55 53 44	3254
	Aldebaran W.	19 50 26	3176	21 17 4	3163	22 43 57	3153	24 11 3	3143
	Jupiter E.	27 1 23	3046	25 32 7	3047	24 2 53	3050	22 33 42	3052
	Regulus E.	61 6 25	3092	59 38 6	3092	58 9 47	3092	56 41 28	3092

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.		Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
15	SUN	W.	72° 10' 53"	2955	73° 42' 2"	2975	75° 12' 46"	2994	76° 43' 6"	3014
	Mars	W.	43 27 46	2898	45 0 23	2905	46 32 36	2923	48 4 26	2941
	Fomalhaut	W.	37 48 51	3087	39 17 17	3073	40 46 1	3080	42 14 59	3052
	α Arietis	E.	32 7 40	3101	30 39 31	3170	29 12 46	3247	27 47 33	3335
	Aldebaran	E.	60 23 8	2618	58 44 37	2636	57 6 31	2655	55 28 51	2673
16	SUN	W.	84 8 52	3105	85 36 55	3124	87 4 36	3140	88 31 57	3157
	Mars	W.	55 37 58	3028	57 7 36	3045	58 36 53	3061	60 5 50	3073
	Fomalhaut	W.	49 41 21	3043	51 10 40	3047	52 39 55	3050	54 9 6	3055
	Aldebaran	E.	47 26 33	2763	45 51 16	2780	44 16 22	2797	42 41 50	2813
	Pollux	E.	91 35 51	2750	90 0 18	2766	88 25 6	2782	86 50 14	2798
	Jupiter	E.	94 20 59	2698	92 44 16	2714	91 7 55	2730	89 31 55	2744
17	SUN	W.	95 43 51	3234	97 9 20	3248	98 34 32	3263	99 50 27	3276
	Mars	W.	67 25 51	3152	68 52 58	3165	70 19 49	3179	71 46 23	3192
	Fomalhaut	W.	61 33 25	3084	63 1 54	3091	64 30 15	3098	65 58 27	3105
	α Pegasi	W.	46 49 25	3094	48 6 18	3067	49 23 40	3044	50 41 27	3023
	Aldebaran	E.	34 54 31	2895	33 22 6	2912	31 50 3	2928	30 18 20	2946
	Pollux	E.	79 0 47	2869	77 27 48	2881	75 55 5	2894	74 22 39	2907
	Jupiter	E.	81 36 40	2815	80 2 31	2828	78 28 39	2840	76 55 3	2852
18	SUN	W.	107 0 19	3337	108 23 48	3347	109 47 5	3358	111 10 10	3368
	Mars	W.	78 55 34	3250	80 20 44	3260	81 45 42	3270	83 10 28	3280
	Fomalhaut	W.	73 17 18	3141	74 44 38	3148	76 11 50	3154	77 38 54	3161
	α Pegasi	W.	57 15 10	3551	58 34 38	3542	59 54 16	3534	61 14 3	3525
	Pollux	E.	66 44 15	2963	65 13 16	2973	63 42 29	2982	62 11 54	2992
	Jupiter	E.	69 10 48	2907	67 38 38	2916	66 6 40	2926	64 34 54	2935
	Regulus	E.	102 44 53	2962	101 13 53	2973	99 43 6	2981	98 12 30	2991
19	SUN	W.	118 2 54	3411	119 24 58	3418	120 46 54	3425	122 8 42	3431
	Mars	W.	90 11 43	3320	91 35 31	3328	92 59 10	3335	94 22 41	3340
	Fomalhaut	W.	84 52 14	3193	86 18 32	3199	87 44 42	3204	89 10 46	3210
	α Pegasi	W.	67 54 43	3501	69 15 6	3498	70 35 32	3496	71 56 1	3493
	Pollux	E.	54 41 45	3033	53 12 13	3039	51 42 49	3047	50 13 34	3053
	Jupiter	E.	56 58 43	2973	55 27 57	2980	53 57 19	2986	52 26 49	2992
	Regulus	E.	90 42 7	3028	89 12 29	3035	87 43 0	3041	86 13 38	3047
20	Mars	W.	101 18 44	3365	102 41 41	3369	104 4 33	3372	105 27 21	3375
	Fomalhaut	W.	96 19 30	3236	97 44 57	3240	99 10 19	3245	100 35 35	3249
	α Pegasi	W.	78 38 58	3487	79 59 37	3486	81 20 17	3486	82 40 57	3486
	Pollux	E.	42 49 10	3081	41 20 37	3086	39 52 10	3091	38 23 49	3095
	Jupiter	E.	44 55 59	3016	43 26 6	3020	41 56 18	3023	40 26 34	3026
	Regulus	E.	78 48 24	3069	77 19 37	3073	75 50 55	3078	74 22 16	3079
21	α Pegasi	W.	89 24 15	3488	90 44 53	3488	92 5 30	3490	93 26 5	3491
	α Arietis	W.	46 2 37	3316	47 26 30	3305	48 50 36	3285	50 14 53	3266
	Pollux	E.	31 3 24	3118	29 35 36	3123	28 7 54	3128	26 40 18	3133
	Jupiter	E.	32 58 47	3039	31 29 23	3041	30 0 1	3043	28 30 41	3044
	Regulus	E.	66 59 49	3089	65 31 26	3091	64 3 5	3091	62 34 45	3091
22	α Pegasi	W.	100 8 32	3503	101 28 53	3506	102 49 11	3509	104 9 25	3514
	α Arietis	W.	57 18 49	3247	58 44 2	3241	60 9 23	3235	61 34 51	3228
	Aldebaran	W.	25 38 21	3134	27 5 49	3128	28 33 25	3121	30 1 9	3115
	Jupiter	E.	21 4 34	3056	19 35 30	3050	18 6 30	3063	16 37 35	3067
	Regulus	E.	55 13 9	3091	53 44 49	3091	52 16 20	3090	50 48 7	3090



GREENWICH MEAN TIME.										
LUNAR DISTANCES.										
Day of the Month.	Star's Name and Position.		Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
23	$\alpha$ Arietis	W.	63° 0' 27"	3222	64° 26' 10"	3215	65° 52' 1"	3210	67° 17' 58"	3204
	Aldebaran	W.	31 29 0	3110	32 56 58	3104	34 25 3	3099	35 53 14	3094
	Regulus	E.	49 19 45	3089	47 51 22	3087	46 22 57	3086	44 54 30	3085
	Spica	E.	103 22 14	3086	101 54 0	3083	100 25 42	3091	98 57 21	3088
24	$\alpha$ Arietis	W.	74 29 25	3177	75 56 2	3172	77 22 45	3168	78 49 35	3161
	Aldebaran	W.	43 15 39	3069	44 44 26	3065	46 13 19	3060	47 42 18	3055
	Regulus	E.	37 31 52	3078	36 3 16	3078	34 34 39	3076	33 6 0	3076
	Spica	E.	91 34 43	3073	90 5 59	3069	88 37 11	3065	87 8 18	3061
25	$\alpha$ Arietis	W.	86 5 17	3136	87 32 43	3130	89 0 16	3126	90 27 54	3120
	Aldebaran	W.	55 8 45	3030	56 38 21	3024	58 8 4	3019	59 37 53	3014
	Spica	E.	79 42 42	3040	78 13 19	3036	76 43 51	3031	75 14 17	3027
26	$\alpha$ Arietis	W.	97 47 35	3097	99 15 48	3092	100 44 7	3088	102 12 31	3083
	Aldebaran	W.	67 8 42	2985	68 39 13	2980	70 9 51	2973	71 40 37	2968
	Pollux	W.	23 7 16	3039	24 36 41	3036	26 6 22	3014	27 36 18	3003
	Jupiter	W.	21 23 26	2950	22 54 41	2943	24 26 7	2934	25 57 43	2927
	Spica	E.	67 45 3	3004	66 14 55	2999	64 44 41	2994	63 14 21	2989
27	Aldebaran	W.	79 16 22	2936	80 47 55	2930	82 19 36	2923	83 51 26	2916
	Pollux	W.	35 9 8	2955	36 40 17	2946	38 11 37	2938	39 43 8	2930
	Jupiter	W.	33 38 4	2890	35 10 36	2883	36 43 17	2876	38 16 7	2869
	Spica	E.	55 41 7	2965	54 10 10	2960	52 39 7	2955	51 7 58	2950
	Antares	E.	101 32 46	2946	100 1 25	2939	98 29 56	2932	96 58 18	2925
28	Aldebaran	W.	91 32 46	2880	93 5 30	2873	94 38 23	2866	96 11 26	2858
	Pollux	W.	47 23 21	2887	48 55 56	2880	50 28 41	2871	52 1 37	2862
	Jupiter	W.	46 2 39	2831	47 36 27	2824	49 10 24	2816	50 44 31	2808
	Spica	E.	43 30 42	2927	41 58 58	2924	40 27 10	2920	38 55 17	2918
	Antares	E.	89 17 55	2890	87 45 23	2882	86 12 41	2875	84 39 50	2866
	Venus	E.	107 32 12	3311	106 8 13	3302	104 44 4	3294	103 19 46	3285
29	Pollux	W.	59 49 5	2818	61 23 9	2809	62 57 25	2800	64 31 53	2791
	Jupiter	W.	58 37 47	2766	60 12 59	2757	61 48 23	2749	63 23 58	2740
	Regulus	W.	23 58 21	2873	25 31 14	2858	27 4 27	2843	28 37 59	2828
	Spica	E.	31 15 10	2919	29 43 7	2914	28 11 6	2918	26 39 10	2924
	Antares	E.	76 53 1	2827	75 19 8	2818	73 45 4	2810	72 10 49	2801
	Venus	E.	96 15 39	3241	94 50 18	3231	93 24 45	3221	91 59 1	3211
30	Pollux	W.	72 27 21	2741	74 3 6	2732	75 39 4	2721	77 15 16	2710
	Jupiter	W.	71 24 58	2692	73 1 48	2682	74 38 52	2672	76 16 10	2661
	Regulus	W.	36 30 9	2763	38 5 26	2750	39 40 59	2738	41 16 48	2726
	Antares	E.	64 16 40	2756	62 41 14	2747	61 5 36	2738	59 29 46	2728
	Venus	E.	84 47 20	3159	83 20 22	3148	81 53 11	3137	80 25 46	3125
	Saturn	E.	101 0 48	2772	99 25 44	2762	97 50 26	2751	96 14 54	2741
	Sun	E.	125 29 9	3103	124 1 3	3091	122 32 43	3080	121 4 9	3068
31	Pollux	W.	85 19 56	2655	86 57 37	2643	88 35 34	2632	90 13 46	2619
	Jupiter	W.	84 26 13	2607	86 4 58	2596	87 43 59	2584	89 23 16	2572
	Regulus	W.	49 19 57	2685	50 57 24	2652	52 35 9	2639	54 13 11	2626
	Antares	E.	51 27 22	2679	49 50 14	2669	48 12 53	2660	46 35 19	2650
	Venus	E.	73 5 9	3065	71 36 17	3053	70 7 10	3040	68 37 47	3028
	Saturn	E.	88 13 39	2685	86 36 39	2673	84 59 23	2662	83 21 52	2649
	Sun	E.	113 37 37	3007	112 7 33	2994	110 37 13	2981	109 6 37	2969

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.		Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
23	$\alpha$ Arietis	W.	68 44 2	3198	70 10 13	3193	71 36 30	3188	73 2 54	3182
	Aldebaran	W.	37 21 31	3089	38 49 54	3084	40 18 23	3079	41 46 58	3074
	Regulus	E.	43 26 2	3083	41 57 32	3082	40 29 0	3081	39 0 27	3079
	Spica	E.	97 28 57	3085	96 0 29	3082	94 31 58	3079	93 3 23	3075
24	$\alpha$ Arietis	W.	80 16 31	3156	81 43 33	3150	83 10 42	3146	84 37 56	3140
	Aldebaran	W.	49 11 23	3050	50 40 34	3044	52 9 52	3040	53 39 15	3034
	Regulus	E.	31 37 21	3075	30 8 41	3076	28 40 2	3078	27 11 23	3078
	Spica	E.	85 39 21	3057	84 10 19	3053	82 41 12	3049	81 12 0	3046
25	$\alpha$ Arietis	W.	91 55 39	3116	93 23 29	3111	94 51 25	3106	96 19 27	3101
	Aldebaran	W.	61 7 49	3008	62 37 52	3002	64 8 2	2997	65 38 19	2992
	Spica	E.	73 44 38	3022	72 14 53	3018	70 45 2	3013	69 15 5	3009
26	$\alpha$ Arietis	W.	103 41 1	3080	105 9 35	3075	106 38 15	3071	108 7 0	3068
	Aldebaran	W.	73 11 30	2969	74 42 31	2955	76 13 40	2949	77 44 57	2942
	Pollux	W.	29 6 27	2993	30 36 49	2982	32 7 24	2973	33 38 10	2964
	Jupiter	W.	27 29 28	2913	29 1 23	2912	30 33 27	2904	32 5 41	2897
	Spica	E.	61 43 54	2985	60 13 22	2979	58 42 43	2974	57 11 58	2960
27	Aldebaran	W.	85 23 24	2909	86 55 31	2902	88 27 47	2895	90 0 12	2888
	Pollux	W.	41 14 49	2921	42 46 41	2912	44 18 44	2905	45 50 57	2896
	Jupiter	W.	39 49 6	2861	41 22 15	2854	42 55 33	2846	44 29 1	2838
	Spica	E.	49 36 42	2945	48 5 20	2941	46 33 53	2936	45 2 20	2932
	Antares	E.	95 26 31	2918	93 54 35	2912	92 22 31	2905	90 50 18	2897
28	Aldebaran	W.	97 44 39	2850	99 18 2	2842	100 51 35	2835	102 25 18	2828
	Pollux	W.	53 34 44	2854	55 8 2	2845	56 41 32	2836	58 15 13	2828
	Jupiter	W.	52 18 49	2800	53 53 17	2792	55 27 56	2783	57 2 46	2775
	Spica	E.	37 23 21	2915	35 51 21	2913	34 19 19	2912	32 47 15	2911
	Antares	E.	83 6 48	2859	81 33 37	2851	80 0 15	2843	78 26 43	2835
	Venus	E.	101 55 17	2976	100 30 38	2968	99 5 49	2959	97 40 49	2950
29	Pollux	W.	66 6 33	2781	67 41 26	2772	69 16 31	2762	70 51 49	2751
	Jupiter	W.	64 59 45	2731	66 35 44	2721	68 11 56	2711	69 48 21	2702
	Regulus	W.	30 11 50	2815	31 45 59	2801	33 20 25	2788	34 55 9	2775
	Spica	E.	25 7 22	2935	23 35 47	2948	22 4 29	2965	20 33 32	2987
	Antares	E.	70 36 22	2792	69 1 44	2784	67 26 55	2775	65 51 54	2765
	Venus	E.	90 33 5	2901	89 6 57	2911	87 40 37	2918	86 14 5	2910
30	Pollux	W.	78 51 43	2699	80 28 24	2688	82 5 20	2678	83 42 30	2666
	Jupiter	W.	77 53 42	2651	79 31 28	2640	81 9 28	2629	82 47 43	2618
	Regulus	W.	42 52 53	2714	44 29 14	2701	46 5 52	2689	47 42 46	2677
	Antares	E.	57 53 43	2718	56 17 27	2709	54 40 59	2698	53 4 17	2689
	Venus	E.	78 58 7	3114	77 30 14	3102	76 2 7	3090	74 33 45	3078
	Saturn	E.	94 30 8	2729	93 3 7	2719	91 26 52	2708	89 50 23	2697
	Sun	E.	119 35 20	3056	118 6 17	3044	116 36 59	3032	115 7 26	3019
31	Pollux	W.	91 52 15	2607	93 31 1	2595	95 10 3	2583	96 49 22	2570
	Jupiter	W.	91 2 49	2560	92 42 39	2548	94 22 45	2536	96 3 8	2524
	Regulus	W.	55 51 30	2614	57 30 6	2601	59 9 0	2588	60 48 12	2575
	Antares	E.	44 57 32	2640	43 19 31	2631	41 41 18	2621	40 2 52	2612
	Venus	E.	67 8 9	3014	65 38 14	3001	64 8 3	2988	62 37 35	2974
	Saturn	E.	81 44 4	2638	80 6 0	2625	78 27 39	2612	76 49 1	2600
	Sun	E.	107 35 45	2955	106 4 36	2941	104 33 10	2928	103 1 27	2915

## AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S					Sidereal Time of the Semidiameter passing the Meridian.	Equation of Time, to be added to Apparent Time.	Diff. for 1 hour.
		Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Semidiameter.			
Thur.	1	<sup>h</sup> 20 <sup>m</sup> 57 <sup>s</sup> 53.20	10.201	S. 17° 12' 15.1"	42.43	16' 16.07	68.32	<sup>m</sup> 13 <sup>s</sup> 47.98	0.344
Frid.	2	21 1 57.60	10.167	16 55 7.5	43.18	16 15.91	68.20	13 55.80	0.310
Sat.	3	21 6 1.20	10.134	16 37 42.3	43.92	16 15.76	68.10	14 2.82	0.277
Sun.	4	21 10 4.00	10.099	16 19 59.5	44.64	16 15.59	67.98	14 9.03	0.243
Mon.	5	21 14 5.99	10.066	16 1 59.8	45.33	16 15.42	67.86	14 14.45	0.210
Tues.	6	21 18 7.17	10.032	15 43 43.6	46.02	16 15.25	67.74	14 19.07	0.176
Wed.	7	21 22 7.55	9.999	15 25 11.2	46.68	16 15.08	67.62	14 22.89	0.143
Thur.	8	21 26 7.13	9.965	15 6 23.0	47.34	16 14.90	67.50	14 25.91	0.109
Frid.	9	21 30 5.92	9.932	14 47 19.4	47.96	16 14.72	67.39	14 28.14	0.076
Sat.	10	21 34 3.91	9.900	14 28 1.0	48.58	16 14.54	67.28	14 29.57	0.044
Sun.	11	21 38 1.11	9.867	14 8 28.2	49.17	16 14.36	67.17	14 30.22	+0.011
Mon.	12	21 41 57.51	9.835	13 48 41.3	49.74	16 14.17	67.06	14 30.07	-0.021
Tues.	13	21 45 53.14	9.803	13 28 40.9	50.30	16 13.98	66.95	14 29.15	0.053
Wed.	14	21 49 48.01	9.771	13 8 27.4	50.83	16 13.78	66.84	14 27.45	0.085
Thur.	15	21 53 42.12	9.739	12 48 1.0	51.34	16 13.59	66.73	14 25.00	0.116
Frid.	16	21 57 35.47	9.708	12 27 22.4	51.85	16 13.39	66.63	14 21.81	0.147
Sat.	17	22 1 28.08	9.677	12 6 32.1	52.33	16 13.18	66.53	14 17.89	0.178
Sun.	18	22 5 19.95	9.646	11 45 30.3	52.80	16 12.98	66.43	14 13.22	0.209
Mon.	19	22 9 11.10	9.616	11 24 17.5	53.26	16 12.75	66.33	14 7.83	0.239
Tues.	20	22 13 1.57	9.588	11 2 54.1	53.69	16 12.57	66.24	14 1.74	0.267
Wed.	21	22 16 51.37	9.561	10 41 20.5	54.10	16 12.35	66.14	13 54.99	0.294
Thur.	22	22 20 40.50	9.534	10 19 37.0	54.51	16 12.13	66.05	13 47.59	0.321
Frid.	23	22 24 28.98	9.507	9 57 44.1	54.89	16 11.90	65.96	13 39.55	0.348
Sat.	24	22 28 16.84	9.483	9 35 42.3	55.26	16 11.67	65.87	13 30.89	0.372
Sun.	25	22 32 4.11	9.458	9 13 32.0	55.61	16 11.44	65.78	13 21.63	0.397
Mon.	26	22 35 50.80	9.434	8 51 13.3	55.95	16 11.20	65.70	13 11.78	0.421
Tues.	27	22 39 36.92	9.411	8 28 46.6	56.27	16 10.96	65.62	13 1.37	0.444
Wed.	28	22 43 22.49	9.388	8 6 12.5	56.57	16 10.71	65.54	12 50.43	0.467
Thur.	29	22 47 7.55	9.367	7 43 31.4	56.86	16 10.46	65.46	12 38.98	0.488
Frid.	30	22 50 52.11	9.347	S. 7 20 43.6	57.12	16 10.21	65.39	12 27.01	0.508

NOTE.—Mean Time of the Semidiameter passing may be found by subtracting 0s.18 from the Sidereal Time.

## AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S								Equation of Time, to be subtracted from Mean Time.	Diff. for 1 hour.	Sidereal Time or Right Ascension of Mean Sun.			
		Apparent Right Ascension.			Diff. for 1 hour.	Apparent Declination.			Diff. for 1 hour.						
		<sup>h</sup>	<sup>m</sup>	<sup>s</sup>		<sup>s</sup>	<sup>o</sup>	<sup>'</sup>					<sup>"</sup>	<sup>m</sup>	<sup>s</sup>
Thur.	1	20	57	50.85	10.200	S. 17	12	24.8	42.42	13	47.89	0.344	20	44	2.96
Frid.	2	21	1	55.24	10.166	16	55	17.5	43.17	13	55.72	0.310	20	47	59.52
Sat.	3	21	5	58.83	10.133	16	37	52.5	43.91	14	2.75	0.277	20	51	56.08
Sun.	4	21	10	1.62	10.099	16	20	10.0	44.63	14	8.98	0.243	20	55	52.64
Mon.	5	21	14	3.60	10.066	16	2	10.6	45.32	14	14.41	0.210	20	59	49.19
Tues.	6	21	18	4.78	10.032	15	43	54.6	46.01	14	19.03	0.176	21	3	45.75
Wed.	7	21	22	5.16	9.999	15	25	22.3	46.67	14	22.86	0.143	21	7	42.30
Thur.	8	21	26	4.74	9.965	15	6	34.4	47.33	14	25.88	0.109	21	11	38.86
Frid.	9	21	30	3.53	9.932	14	47	31.0	47.95	14	28.12	0.076	21	15	35.41
Sat.	10	21	34	1.52	9.900	14	28	12.7	48.57	14	29.55	0.044	21	19	31.97
Sun.	11	21	37	58.73	9.867	14	8	39.9	49.16	14	30.21	+0.011	21	23	28.52
Mon.	12	21	41	55.14	9.835	13	48	53.2	49.73	14	30.06	-0.021	21	27	25.08
Tues.	13	21	45	50.78	9.803	13	28	52.9	50.29	14	29.15	0.053	21	31	21.63
Wed.	14	21	49	45.65	9.771	13	8	39.6	50.82	14	27.46	0.085	21	35	18.19
Thur.	15	21	53	39.78	9.740	12	48	13.3	51.34	14	25.04	0.116	21	39	14.74
Frid.	16	21	57	33.15	9.709	12	27	34.8	51.85	14	21.85	0.147	21	43	11.30
Sat.	17	22	1	25.78	9.678	12	6	44.6	52.33	14	17.93	0.178	21	47	7.85
Sun.	18	22	5	17.67	9.647	11	45	42.8	52.80	14	13.27	0.209	21	51	4.40
Mon.	19	22	9	8.84	9.617	11	24	30.0	53.26	14	7.88	0.239	21	55	0.96
Tues.	20	22	12	59.33	9.589	11	3	6.6	53.69	14	1.82	0.267	21	58	57.51
Wed.	21	22	16	49.14	9.562	10	41	33.0	54.10	13	55.07	0.294	22	2	54.07
Thur.	22	22	20	38.30	9.535	10	19	49.6	54.51	13	47.68	0.321	22	6	50.62
Frid.	23	22	24	26.81	9.508	9	57	56.7	54.89	13	39.63	0.348	22	10	47.18
Sat.	24	22	28	14.70	9.484	9	35	54.8	55.26	13	30.97	0.372	22	14	43.73
Sun.	25	22	32	2.00	9.459	9	13	44.3	55.61	13	21.72	0.397	22	18	40.28
Mon.	26	22	35	48.71	9.435	8	51	25.5	55.95	13	11.87	0.421	22	22	36.84
Tues.	27	22	39	34.87	9.412	8	28	58.8	56.27	13	1.48	0.444	22	26	33.39
Wed.	28	22	43	20.47	9.389	8	6	24.8	56.57	12	50.53	0.467	22	30	29.94
Thur.	29	22	47	5.57	9.368	7	43	43.4	56.86	12	39.07	0.488	22	34	26.50
Frid.	30	22	50	50.16	9.348	S. 7	20	55.4	57.13	12	27.11	0.508	22	38	23.05

NOTE.—The Semidiameter for Mean Noon may be assumed the same as that for Apparent Noon.

Diff. for 1 hour  
+9<sup>s</sup>.8565

AT GREENWICH MEAN NOON.									
Day of the Month.	Day of the Year.	THE SUN'S					Logarithm of the Radius Vector of the Earth.	Diff. for 1 hour.	Mean Time of Sidereal Ch.
		True LONGITUDE.		Diff. for 1 hour.	LATITUDE.				
		$\lambda$	$\lambda'$						
1	32	312° 0' 7.6	0 19.0	152.18	+0.56	.99936947	+28.6	3 15 24.92	
2	33	313 0 59.5	1 10.8	152.14	0.45	.99937645	29.4	3 11 29.02	
3	34	314 1 50.5	2 1.6	152.10	0.32	.99938361	30.1	3 7 33.11	
4	35	315 2 40.6	2 51.6	152.06	0.18	.99939094	30.8	3 3 37.20	
5	36	316 3 29.7	3 40.5	152.02	+0.04	.99939843	31.4	2 59 41.29	
6	37	317 4 17.8	4 28.5	151.98	-0.09	.99940606	32.0	2 55 45.37	
7	38	318 5 4.9	5 15.4	151.93	0.20	.99941382	32.5	2 51 49.46	
8	39	319 5 50.8	6 1.2	151.88	0.30	.99942170	33.0	2 47 53.55	
9	40	320 6 35.4	6 45.6	151.83	0.38	.99942969	33.5	2 43 57.64	
10	41	321 7 18.6	7 28.8	151.77	0.44	.99943779	33.9	2 40 1.73	
11	42	322 8 0.4	8 10.4	151.71	0.45	.99944600	34.4	2 36 5.82	
12	43	323 8 40.6	8 50.5	151.64	0.44	.99945433	34.9	2 32 9.91	
13	44	324 9 19.0	9 28.7	151.57	0.40	.99946277	35.4	2 28 14.00	
14	45	325 9 55.7	10 5.3	151.50	0.33	.99947134	35.9	2 24 18.10	
15	46	326 10 30.8	10 40.2	151.43	0.23	.99948004	36.5	2 20 22.19	
16	47	327 11 4.1	11 13.4	151.35	-0.12	.99948888	37.1	2 16 26.28	
17	48	328 11 35.6	11 44.7	151.27	0.00	.99949787	37.8	2 12 30.37	
18	49	329 12 5.2	12 14.3	151.19	+0.13	.99950703	38.5	2 8 34.45	
19	50	330 12 32.9	12 41.8	151.11	0.25	.99951636	39.2	2 4 38.54	
20	51	331 12 58.8	13 7.7	151.04	0.37	.99952586	39.9	2 0 42.63	
21	52	332 13 22.9	13 31.6	150.96	0.47	.99953553	40.6	1 56 46.72	
22	53	333 13 45.1	13 53.7	150.89	0.56	.99954539	41.4	1 52 50.83	
23	54	334 14 5.5	14 13.9	150.81	0.62	.99955545	42.2	1 48 54.92	
24	55	335 14 24.2	14 32.6	150.74	0.64	.99956570	43.0	1 44 59.01	
25	56	336 14 41.3	14 49.5	150.67	0.64	.99957614	43.8	1 41 3.10	
26	57	337 14 56.7	15 4.9	150.61	0.61	.99958677	44.6	1 37 7.20	
27	58	338 15 10.5	15 18.5	150.54	0.54	.99959757	45.3	1 33 11.29	
28	59	339 15 22.7	15 30.7	150.48	0.45	.99960852	45.9	1 29 15.38	
29	60	340 15 33.4	15 41.2	150.42	0.34	.99961961	46.5	1 25 19.47	
30	61	341 15 42.5	15 50.3	150.35	+0.22	.99963084	+47.0	1 21 23.57	
NOTE: $\lambda$ corresponds to the true equinox of the date, $\lambda'$ to the mean equinox of January 0d.									Diff. for 1 hour —9 <sup>h</sup> .8296

## GREENWICH MEAN TIME.

Day of the Month.	THE MOON'S								
	SEMI-DIAMETER.		HORIZONTAL PARALLAX.				MERIDIAN PASSAGE.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 hour.	Midnight.	Diff. for 1 hour.		Diff. for 1 hour.	Noon.
1	15' 42.4	15' 48.2	57' 32.1	+1.74	57' 53.3	+1.80	<sup>h</sup> 17 <sup>m</sup> 49.4	<sup>m</sup> 2.05	<sup>d</sup> 21.9
2	15 54.1	16 0.1	58 15.1	1.83	58 37.2	1.84	18 40.5	2.22	22.9
3	16 6.1	16 11.9	58 59.1	1.81	59 20.4	1.74	19 36.0	2.41	23.9
4	16 17.4	16 22.5	59 40.7	1.63	59 59.5	1.48	20 35.9	2.58	24.9
5	16 27.1	16 30.9	60 16.1	1.28	60 30.0	1.03	21 39.3	2.67	25.9
6	16 33.8	16 35.7	60 40.7	0.74	60 47.6	+0.42	22 43.9	2.65	26.9
7	16 36.5	16 36.1	60 50.6	+0.07	60 49.2	-0.29	23 46.5	2.54	27.9
8	16 34.5	16 31.8	60 43.5	-0.65	60 33.6	1.08	<sup>δ</sup> 0 45.5	2.36	28.9
9	16 28.0	16 23.2	60 19.6	1.32	60 1.9	1.61	0 45.5	2.36	0.4
10	16 17.5	16 11.1	59 41.1	1.86	59 17.6	2.05	1 40.1	2.19	1.4
11	16 4.2	15 56.9	58 52.0	2.19	58 25.2	2.28	2 30.8	2.04	2.4
12	15 49.4	15 41.8	57 57.6	2.31	57 30.0	2.29	3 18.5	1.94	3.4
13	15 34.4	15 27.3	57 2.8	2.23	56 36.5	2.13	4 4.3	1.89	4.4
14	15 20.5	15 14.2	56 11.7	2.00	55 48.7	1.84	4 49.3	1.88	5.4
15	15 8.5	15 3.4	55 27.6	1.66	55 8.8	1.47	5 34.5	1.90	6.4
16	14 58.9	14 55.1	54 52.4	1.27	54 38.5	1.06	6 20.5	1.94	7.4
17	14 52.0	14 49.6	54 27.1	0.84	54 18.2	0.63	7 7.9	2.00	8.4
18	14 47.9	14 46.8	54 11.8	0.43	54 7.9	-0.23	7 56.5	2.05	9.4
19	14 46.4	14 46.6	54 6.8	-0.04	54 7.0	+0.14	8 46.1	2.08	10.4
20	14 47.3	14 48.6	54 9.7	+0.31	54 14.3	0.46	9 36.0	2.07	11.4
21	14 50.3	14 52.5	54 20.7	0.60	54 28.7	0.72	10 25.4	2.04	12.4
22	14 55.0	14 57.8	54 37.9	0.83	54 48.4	0.92	11 13.7	1.98	13.4
23	15 1.0	15 4.3	54 59.9	0.99	55 12.2	1.06	12 0.6	1.92	14.4
24	15 7.9	15 11.5	55 25.2	1.10	55 38.7	1.14	12 46.2	1.88	15.4
25	15 15.3	15 19.2	55 52.6	1.17	56 6.8	1.19	13 30.8	1.85	16.4
26	15 23.1	15 27.1	56 21.3	1.21	56 35.9	1.22	14 15.2	1.86	17.4
27	15 31.1	15 35.1	56 50.6	1.23	57 5.3	1.23	15 0.4	1.91	18.4
28	15 39.1	15 43.2	57 20.1	1.23	57 34.9	1.23	15 47.1	2.00	19.4
29	15 47.1	15 51.2	57 49.6	1.23	58 4.3	1.22	16 36.4	2.14	20.4
30	15 55.2	15 59.1	58 18.9	+1.21	58 33.3	+1.19	17 29.7	2.29	21.4

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
THURSDAY 1.					SATURDAY 3.				
0	13 <sup>h</sup> 59 <sup>m</sup> 0.28 <sup>s</sup>	2.0545	S. 7° 58' 12.5"	13.330	0	15 <sup>h</sup> 43 <sup>m</sup> 54.22 <sup>s</sup>	2.3375	S. 17° 45' 38.2"	10.601
1	14 1 3.80	2.0608	8 11 31.5	13.305	1	15 46 14.69	2.3447	17 56 11.5	10.508
2	14 3 7.58	2.0652	8 24 49.0	13.278	2	15 48 35.59	2.3518	18 6 39.1	10.413
3	14 5 11.63	2.0697	8 38 4.9	13.251	3	15 50 56.91	2.3589	18 17 1.0	10.316
4	14 7 15.95	2.0742	8 51 19.1	13.222	4	15 53 18.66	2.3661	18 27 17.0	10.217
5	14 9 20.54	2.0787	9 4 31.5	13.191	5	15 55 40.85	2.3733	18 37 27.1	10.117
6	14 11 25.40	2.0833	9 17 42.0	13.159	6	15 58 3.47	2.3805	18 47 31.1	10.015
7	14 13 30.54	2.0880	9 30 50.6	13.127	7	16 0 26.52	2.3877	18 57 28.9	9.911
8	14 15 35.97	2.0928	9 43 57.2	13.094	8	16 2 50.00	2.3950	19 7 20.5	9.806
9	14 17 41.70	2.0977	9 57 1.8	13.059	9	16 5 13.92	2.4022	19 17 5.7	9.699
10	14 19 47.72	2.1027	10 10 4.2	13.022	10	16 7 38.27	2.4094	19 26 44.4	9.591
11	14 21 54.04	2.1077	10 23 4.4	12.984	11	16 10 3.05	2.4166	19 36 16.6	9.481
12	14 24 0.65	2.1128	10 36 2.3	12.945	12	16 12 28.27	2.4238	19 45 42.1	9.369
13	14 26 7.57	2.1180	10 48 57.7	12.904	13	16 14 53.92	2.4311	19 55 0.9	9.255
14	14 28 14.81	2.1233	11 1 50.7	12.863	14	16 17 20.01	2.4383	20 4 12.8	9.139
15	14 30 22.37	2.1287	11 14 41.3	12.821	15	16 19 46.53	2.4455	20 13 17.6	9.021
16	14 32 30.25	2.1340	11 27 29.3	12.777	16	16 22 13.48	2.4528	20 22 15.3	8.903
17	14 34 38.45	2.1393	11 40 14.5	12.731	17	16 24 40.87	2.4601	20 31 5.9	8.783
18	14 36 46.98	2.1448	11 52 56.9	12.684	18	16 27 8.69	2.4673	20 39 49.3	8.661
19	14 38 55.84	2.1505	12 5 36.5	12.636	19	16 29 36.94	2.4744	20 48 25.3	8.537
20	14 41 5.04	2.1562	12 18 13.1	12.586	20	16 32 5.62	2.4815	20 56 53.7	8.411
21	14 43 14.58	2.1614	12 30 46.8	12.536	21	16 34 34.72	2.4886	21 5 14.5	8.284
22	14 45 24.46	2.1677	12 43 17.4	12.484	22	16 37 4.25	2.4957	21 13 27.7	8.155
23	14 47 34.70	2.1735	S. 12° 55' 44.8"	12.431	23	16 39 34.20	2.5028	S. 21° 21' 33.1"	8.024
FRIDAY 2.					SUNDAY 4.				
0	14 49 45.29	2.1793	S. 13° 8' 8.9"	12.375	0	16 42 4.58	2.5098	S. 21° 29' 30.7"	7.892
1	14 51 56.23	2.1853	13 20 29.6	12.317	1	16 44 35.38	2.5168	21 37 20.2	7.759
2	14 54 7.54	2.1915	13 32 46.9	12.260	2	16 47 6.59	2.5237	21 45 1.6	7.624
3	14 56 19.21	2.1976	13 45 0.8	12.201	3	16 49 38.21	2.5305	21 52 34.9	7.487
4	14 58 31.25	2.2037	13 57 11.1	12.140	4	16 52 10.25	2.5373	21 59 59.9	7.348
5	15 0 43.66	2.2098	14 9 17.6	12.077	5	16 54 42.69	2.5441	22 7 16.6	7.207
6	15 2 56.44	2.2161	14 21 20.2	12.012	6	16 57 15.54	2.5508	22 14 24.8	7.065
7	15 5 9.60	2.2225	14 33 19.0	11.948	7	16 59 48.79	2.5575	22 21 24.4	6.921
8	15 7 23.15	2.2290	14 45 13.9	11.881	8	17 2 22.43	2.5641	22 28 15.3	6.776
9	15 9 37.08	2.2354	14 57 4.8	11.813	9	17 4 56.47	2.5706	22 34 57.5	6.629
10	15 11 51.40	2.2418	15 8 51.5	11.743	10	17 7 30.90	2.5770	22 41 30.8	6.481
11	15 14 6.11	2.2483	15 20 33.9	11.672	11	17 10 5.71	2.5833	22 47 55.2	6.331
12	15 16 21.21	2.2549	15 32 12.1	11.599	12	17 12 40.90	2.5896	22 54 10.6	6.180
13	15 18 36.71	2.2617	15 43 45.9	11.525	13	17 15 16.47	2.5959	23 0 16.8	6.026
14	15 20 52.61	2.2684	15 55 15.1	11.449	14	17 17 52.41	2.6020	23 6 13.8	5.872
15	15 23 8.92	2.2752	16 6 39.7	11.371	15	17 20 28.71	2.6080	23 12 1.5	5.716
16	15 25 25.63	2.2819	16 17 59.6	11.292	16	17 23 5.37	2.6140	23 17 39.8	5.560
17	15 27 42.75	2.2887	16 29 14.7	11.211	17	17 25 42.38	2.6198	23 23 8.7	5.402
18	15 30 0.28	2.2955	16 40 24.9	11.129	18	17 28 19.74	2.6255	23 28 28.0	5.242
19	15 32 18.22	2.3025	16 51 30.1	11.045	19	17 30 57.44	2.6312	23 33 37.7	5.080
20	15 34 36.58	2.3095	17 2 30.3	10.959	20	17 33 35.47	2.6367	23 38 37.6	4.917
21	15 36 55.36	2.3164	17 13 25.3	10.872	21	17 36 13.83	2.6420	23 43 27.7	4.753
22	15 39 14.56	2.3234	17 24 15.0	10.783	22	17 38 52.51	2.6473	23 48 7.9	4.588
23	15 41 34.18	2.3305	17 34 59.3	10.693	23	17 41 31.50	2.6525	23 52 38.2	4.421
24	15 43 54.22	2.3375	S. 17° 45' 38.2"	10.601	24	17 44 10.82	2.6577	S. 23° 56' 58.5"	4.253

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
MONDAY 5.					WEDNESDAY 7.				
0	17 44 10.82	2.6577	S. 23° 56' 58.5	4.253	0	19 54 40.74	2.7148	S. 23° 53' 8.3	4.505
1	17 46 50.43	2.6626	24 1 8.6	4.084	1	19 57 23.53	2.7118	23 48 32.6	4.684
2	17 49 30.33	2.6673	24 5 8.5	3.914	2	20 0 6.14	2.7087	23 43 46.2	4.862
3	17 52 10.51	2.6720	24 8 58.3	3.743	3	20 2 48.56	2.7054	23 38 49.2	5.039
4	17 54 50.96	2.6765	24 12 37.8	3.571	4	20 5 30.77	2.7019	23 33 41.6	5.215
5	17 57 31.69	2.6809	24 16 6.8	3.397	5	20 8 12.77	2.6983	23 28 23.4	5.391
6	18 0 12.68	2.6852	24 19 25.4	3.223	6	20 10 54.56	2.6946	23 22 54.7	5.565
7	18 2 53.92	2.6893	24 22 33.6	3.048	7	20 13 36.12	2.6907	23 17 15.6	5.737
8	18 5 35.40	2.6933	24 25 31.1	2.871	8	20 16 17.43	2.6866	23 11 26.2	5.908
9	18 8 17.12	2.6972	24 28 17.9	2.692	9	20 18 58.49	2.6824	23 5 26.6	6.078
10	18 10 59.06	2.7009	24 30 54.1	2.514	10	20 21 39.30	2.6782	22 59 16.8	6.248
11	18 13 41.21	2.7045	24 33 19.6	2.335	11	20 24 19.86	2.6738	22 52 56.9	6.416
12	18 16 23.58	2.7079	24 35 34.3	2.155	12	20 27 0.15	2.6692	22 46 26.9	6.583
13	18 19 6.15	2.7111	24 37 38.2	1.974	13	20 29 40.16	2.6645	22 39 47.0	6.748
14	18 21 48.90	2.7141	24 39 31.2	1.792	14	20 32 19.88	2.6597	22 32 57.2	6.913
15	18 24 31.82	2.7169	24 41 13.2	1.610	15	20 34 59.31	2.6547	22 25 57.5	7.076
16	18 27 14.91	2.7195	24 42 44.3	1.427	16	20 37 38.44	2.6497	22 18 48.1	7.237
17	18 29 58.17	2.7221	24 44 4.4	1.243	17	20 40 17.26	2.6445	22 11 29.2	7.396
18	18 32 41.58	2.7246	24 45 13.4	1.059	18	20 42 55.78	2.6393	22 4 0.7	7.553
19	18 35 25.13	2.7269	24 46 11.4	0.875	19	20 45 33.98	2.6340	21 56 22.7	7.710
20	18 38 8.81	2.7289	24 46 58.3	0.689	20	20 48 11.85	2.6285	21 48 35.4	7.865
21	18 40 52.60	2.7307	24 47 34.0	0.503	21	20 50 49.38	2.6229	21 40 38.9	8.019
22	18 43 36.50	2.7323	24 47 58.6	0.317	22	20 53 26.57	2.6172	21 32 33.2	8.171
23	18 46 20.49	2.7339	S. 24 48 12.0	-0.131	23	20 56 3.43	2.6115	S. 21 24 18.5	8.321
TUESDAY 6.					THURSDAY 8.				
0	18 49 4.57	2.7353	S. 24 48 14.3	+0.055	0	20 58 39.94	2.6056	S. 21 15 54.7	8.469
1	18 51 48.73	2.7365	24 48 5.4	0.243	1	21 1 16.09	2.5996	21 7 22.0	8.616
2	18 54 32.95	2.7375	24 47 45.2	0.432	2	21 3 51.89	2.5937	20 58 40.6	8.761
3	18 57 17.23	2.7383	24 47 13.6	0.620	3	21 6 27.33	2.5877	20 49 50.7	8.904
4	19 0 1.55	2.7388	24 46 30.8	0.806	4	21 9 2.40	2.5815	20 40 52.2	9.046
5	19 2 45.90	2.7393	24 45 36.8	0.993	5	21 11 37.09	2.5752	20 31 45.2	9.187
6	19 5 30.28	2.7396	24 44 31.8	1.180	6	21 14 11.41	2.5688	20 22 29.8	9.325
7	19 8 14.67	2.7398	24 43 15.4	1.368	7	21 16 45.35	2.5625	20 13 6.2	9.461
8	19 10 59.06	2.7398	24 41 47.7	1.556	8	21 19 18.91	2.5562	20 3 34.5	9.595
9	19 13 43.44	2.7396	24 40 8.7	1.744	9	21 21 52.08	2.5497	19 53 54.8	9.728
10	19 16 27.80	2.7392	24 38 18.5	1.930	10	21 24 24.86	2.5432	19 44 7.2	9.859
11	19 19 12.13	2.7385	24 36 17.1	2.116	11	21 26 57.25	2.5367	19 34 11.8	9.983
12	19 21 56.41	2.7377	24 34 4.6	2.303	12	21 29 29.25	2.5300	19 24 8.6	10.115
13	19 24 40.64	2.7367	24 31 40.9	2.490	13	21 32 0.85	2.5233	19 13 57.8	10.240
14	19 27 24.81	2.7355	24 29 5.9	2.677	14	21 34 32.04	2.5165	19 3 39.7	10.363
15	19 30 8.90	2.7342	24 26 19.7	2.863	15	21 37 2.83	2.5096	18 53 14.3	10.484
16	19 32 52.91	2.7328	24 23 22.4	3.047	16	21 39 33.22	2.5031	18 42 41.6	10.603
17	19 35 36.83	2.7319	24 20 14.1	3.231	17	21 42 3.20	2.4962	18 32 1.9	10.721
18	19 38 20.64	2.7293	24 16 54.7	3.415	18	21 44 32.76	2.4893	18 21 15.1	10.837
19	19 41 4.34	2.7273	24 13 24.3	3.599	19	21 47 1.91	2.4825	18 10 21.4	10.951
20	19 43 48.91	2.7251	24 9 42.9	3.781	20	21 49 30.66	2.4756	17 59 21.0	11.062
21	19 46 31.34	2.7227	24 5 50.6	3.963	21	21 51 59.00	2.4688	17 48 14.0	11.171
22	19 49 14.63	2.7202	24 1 47.3	4.145	22	21 54 26.92	2.4620	17 37 0.5	11.279
23	19 51 57.77	2.7176	23 57 33.2	4.325	23	21 56 54.43	2.4552	17 25 40.6	11.386
24	19 54 40.74	2.7148	S. 23 53 8.3	4.505	24	21 59 21.53	2.4482	S. 17 14 14.2	11.491



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
FRIDAY 9.					SUNDAY 11.				
0	21 59 21.53	2.4489	S. 17° 14' 14.2	11.491	0	23 49 18.76	2.1501	S. 6° 39' 38.4	14.257
1	22 1 48.21	2.4412	17 2 41.6	11.593	1	23 51 27.62	2.1459	6 25 22.5	14.273
2	22 4 14.47	2.4343	16 51 3.2	11.692	2	23 53 36.19	2.1403	6 11 5.8	14.287
3	22 6 40.32	2.4274	16 39 18.9	11.789	3	23 55 44.47	2.1356	5 56 48.2	14.299
4	22 9 5.75	2.4205	16 27 28.7	11.885	4	23 57 52.47	2.1310	5 42 29.9	14.310
5	22 11 30.77	2.4136	16 15 32.8	11.979	5	0 0 0.19	2.1263	5 28 11.0	14.320
6	22 13 55.37	2.4067	16 3 31.3	12.071	6	0 2 7.63	2.1216	5 13 51.5	14.328
7	22 16 19.56	2.3998	15 51 24.4	12.161	7	0 4 14.81	2.1173	4 59 31.6	14.336
8	22 18 43.34	2.3929	15 39 12.1	12.249	8	0 6 21.72	2.1130	4 45 11.3	14.342
9	22 21 6.70	2.3860	15 26 54.5	12.335	9	0 8 28.37	2.1087	4 30 50.6	14.347
10	22 23 29.65	2.3792	15 14 31.8	12.419	10	0 10 34.76	2.1045	4 16 29.7	14.350
11	22 25 52.19	2.3723	15 2 4.2	12.501	11	0 12 40.91	2.1003	4 2 8.7	14.351
12	22 28 14.33	2.3655	14 49 31.7	12.582	12	0 14 46.81	2.0962	3 47 47.7	14.350
13	22 30 36.06	2.3588	14 36 54.4	12.660	13	0 16 52.46	2.0922	3 33 26.7	14.349
14	22 32 57.38	2.3520	14 24 12.5	12.736	14	0 18 57.88	2.0883	3 19 5.8	14.347
15	22 35 18.29	2.3452	14 11 26.1	12.810	15	0 21 3.06	2.0844	3 4 45.0	14.344
16	22 37 38.80	2.3385	13 58 35.3	12.882	16	0 23 8.01	2.0805	2 50 24.5	14.339
17	22 39 58.91	2.3319	13 45 40.2	12.953	17	0 25 12.73	2.0768	2 36 4.4	14.332
18	22 42 18.63	2.3253	13 32 40.9	13.022	18	0 27 17.23	2.0732	2 21 44.7	14.324
19	22 44 37.95	2.3188	13 19 37.6	13.089	19	0 29 21.51	2.0696	2 7 25.5	14.316
20	22 46 56.88	2.3122	13 6 30.3	13.155	20	0 31 25.58	2.0661	1 53 6.8	14.306
21	22 49 15.41	2.3057	12 53 19.0	13.218	21	0 33 29.45	2.0627	1 38 48.7	14.295
22	22 51 33.55	2.2992	12 40 4.0	13.279	22	0 35 33.11	2.0593	1 24 31.4	14.282
23	22 53 51.31	2.2928	S. 12° 26' 45.5	13.337	23	0 37 36.57	2.0560	S. 1° 10' 14.9	14.268
SATURDAY 10.					MONDAY 12.				
0	22 56 8.69	2.2863	S. 12° 13' 23.6	13.394	0	0 39 39.83	2.0527	S. 0° 55' 59.2	14.254
1	22 58 25.68	2.2800	11 59 58.2	13.451	1	0 41 42.90	2.0496	0 41 44.4	14.239
2	23 0 42.30	2.2738	11 46 29.5	13.505	2	0 43 45.79	2.0465	0 27 30.6	14.222
3	23 2 58.54	2.2675	11 32 57.6	13.557	3	0 45 48.49	2.0435	S. 0° 13' 17.9	14.203
4	23 5 14.41	2.2613	11 19 22.6	13.607	4	0 47 51.02	2.0406	N. 0° 0' 53.7	14.183
5	23 7 29.91	2.2552	11 5 44.7	13.655	5	0 49 53.38	2.0378	0 15 4.1	14.163
6	23 9 45.03	2.2490	10 52' 4.0	13.701	6	0 51 55.56	2.0350	0 29 13.3	14.142
7	23 11 59.79	2.2430	10 38 20.6	13.747	7	0 53 57.58	2.0323	0 43 21.1	14.119
8	23 14 14.20	2.2371	10 24 34.4	13.791	8	0 55 59.44	2.0297	0 57 27.5	14.096
9	23 16 28.26	2.2313	10 10 45.6	13.833	9	0 58 1.15	2.0272	1 11 32.6	14.072
10	23 18 41.96	2.2253	9 56 54.4	13.873	10	1 0 2.71	2.0247	1 25 36.2	14.046
11	23 20 55.31	2.2195	9 43 0.9	13.911	11	1 2 4.11	2.0222	1 39 38.1	14.018
12	23 23 8.31	2.2138	9 29 5.2	13.947	12	1 4 5.37	2.0198	1 53 38.3	13.990
13	23 25 20.97	2.2082	9 15 7.3	13.981	13	1 6 6.50	2.0176	2 7 36.9	13.962
14	23 27 33.29	2.2025	9 1 7.5	14.013	14	1 8 7.49	2.0154	2 21 33.7	13.933
15	23 29 45.28	2.1970	8 47 5.7	14.045	15	1 10 8.35	2.0133	2 35 28.8	13.903
16	23 31 56.94	2.1915	8 33 2.1	14.075	16	1 12 9.09	2.0113	2 49 22.1	13.871
17	23 34 8.27	2.1862	8 18 56.7	14.104	17	1 14 9.71	2.0092	3 3 13.3	13.837
18	23 36 19.28	2.1808	8 4 49.6	14.131	18	1 16 10.20	2.0072	3 17 2.4	13.803
19	23 38 29.97	2.1755	7 50 41.0	14.156	19	1 18 10.58	2.0053	3 30 49.5	13.769
20	23 40 40.34	2.1702	7 36 31.0	14.179	20	1 20 10.85	2.0036	3 44 34.6	13.734
21	23 42 50.40	2.1650	7 22 19.7	14.200	21	1 22 11.02	2.0020	3 58 17.6	13.698
22	23 45 0.15	2.1600	7 8 7.1	14.220	22	1 24 11.09	2.0003	4 11 58.3	13.660
23	23 47 9.60	2.1550	6 53 53.3	14.239	23	1 26 11.06	1.9987	4 25 36.7	13.621
24	23 49 18.76	2.1501	S. 6° 39' 38.4	14.257	24	1 28 10.94	1.9972	S. 4° 39' 12.8	13.582

## GREENWICH MEAN TIME

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
TUESDAY 13.					THURSDAY 15.				
0	<sup>h</sup> 1 <sup>m</sup> 28 10.94	1.9972	N. 4 39' 12.8"	13.589	0	<sup>h</sup> 3 3 29.72	1.9957	N. 14 30' 54.9"	10.797
1	1 30 10.73	1.9968	4 52 46.5	13.542	1	3 5 29.50	1.9968	14 41 40.5	10.793
2	1 32 10.44	1.9944	5 6 17.8	13.509	2	3 7 29.35	1.9980	14 52 21.6	10.647
3	1 34 10.06	1.9930	5 19 46.7	13.460	3	3 9 29.27	1.9993	15 2 58.1	10.571
4	1 36 9.61	1.9918	5 33 13.0	13.417	4	3 11 29.27	2.0007	15 13 30.1	10.485
5	1 38 9.09	1.9907	5 46 36.7	13.373	5	3 13 29.35	2.0021	15 23 57.5	10.419
6	1 40 8.50	1.9897	5 59 57.7	13.328	6	3 15 29.52	2.0025	15 34 20.3	10.341
7	1 42 7.85	1.9886	6 13 16.1	13.283	7	3 17 29.77	2.0049	15 44 38.4	10.263
8	1 44 7.13	1.9875	6 26 31.7	13.237	8	3 19 30.11	2.0063	15 54 51.8	10.183
9	1 46 6.35	1.9865	6 39 44.6	13.190	9	3 21 30.54	2.0078	16 5 0.4	10.103
10	1 48 5.52	1.9857	6 52 54.7	13.143	10	3 23 31.06	2.0094	16 15 4.2	10.023
11	1 50 4.65	1.9850	7 6 1.8	13.094	11	3 25 31.68	2.0110	16 25 3.2	9.943
12	1 52 3.73	1.9843	7 19 6.0	13.045	12	3 27 32.39	2.0127	16 34 57.5	9.863
13	1 54 2.77	1.9837	7 32 7.2	12.995	13	3 29 33.20	2.0143	16 44 46.9	9.789
14	1 56 1.77	1.9830	7 45 5.4	12.945	14	3 31 34.11	2.0160	16 54 31.3	9.699
15	1 58 0.73	1.9824	7 58 0.6	12.894	15	3 33 35.12	2.0177	17 4 10.7	9.615
16	1 59 59.66	1.9820	8 10 52.6	12.841	16	3 35 36.23	2.0194	17 13 45.1	9.531
17	2 1 58.57	1.9816	8 23 41.4	12.787	17	3 37 37.45	2.0212	17 23 14.5	9.448
18	2 3 57.46	1.9813	8 36 27.1	12.734	18	3 39 38.78	2.0230	17 32 39.0	9.364
19	2 5 56.33	1.9810	8 49 9.5	12.680	19	3 41 40.22	2.0248	17 41 58.4	9.280
20	2 7 55.18	1.9807	9 1 48.6	12.625	20	3 43 41.77	2.0266	17 51 12.6	9.194
21	2 9 54.01	1.9805	9 14 24.4	12.569	21	3 45 43.42	2.0284	18 0 21.6	9.107
22	2 11 52.84	1.9803	9 26 56.8	12.511	22	3 47 45.19	2.0303	18 9 25.4	9.020
23	2 13 51.66	1.9803	N. 9 39 25.7	12.453	23	3 49 47.07	2.0323	N. 18 18 24.0	8.934
WEDNESDAY 14.					FRIDAY 16.				
0	2 15 50.47	1.9802	N. 9 51 51.2	12.395	0	3 51 49.07	2.0343	N. 18 27 17.5	8.847
1	2 17 49.29	1.9803	10 4 13.1	12.336	1	3 53 51.19	2.0362	18 36 5.7	8.758
2	2 19 48.12	1.9804	10 16 31.5	12.277	2	3 55 53.42	2.0382	18 44 48.5	8.668
3	2 21 46.95	1.9805	10 28 46.4	12.218	3	3 57 55.77	2.0402	18 53 25.8	8.578
4	2 23 45.79	1.9806	10 40 57.6	12.156	4	3 59 58.24	2.0422	19 1 57.8	8.488
5	2 25 44.65	1.9810	10 53 5.1	12.094	5	4 2 0.83	2.0442	19 10 24.4	8.398
6	2 27 43.52	1.9813	11 5 8.8	12.031	6	4 4 3.55	2.0463	19 18 45.7	8.308
7	2 29 42.41	1.9817	11 17 8.8	11.968	7	4 6 6.39	2.0483	19 27 1.5	8.217
8	2 31 41.33	1.9822	11 29 5.0	11.905	8	4 8 9.36	2.0504	19 35 11.7	8.124
9	2 33 40.28	1.9827	11 40 57.4	11.841	9	4 10 12.45	2.0525	19 43 16.3	8.031
10	2 35 39.26	1.9832	11 52 45.9	11.775	10	4 12 15.66	2.0545	19 51 15.4	7.938
11	2 37 38.27	1.9837	12 4 30.4	11.709	11	4 14 19.00	2.0567	19 59 8.9	7.845
12	2 39 37.31	1.9843	12 16 11.0	11.643	12	4 16 22.47	2.0588	20 6 56.7	7.751
13	2 41 36.39	1.9850	12 27 47.6	11.576	13	4 18 26.07	2.0609	20 14 38.9	7.656
14	2 43 35.52	1.9858	12 39 20.1	11.508	14	4 20 29.79	2.0630	20 22 15.4	7.560
15	2 45 34.69	1.9865	12 50 48.6	11.440	15	4 22 33.64	2.0652	20 29 46.1	7.464
16	2 47 33.91	1.9873	13 2 13.0	11.372	16	4 24 37.62	2.0673	20 37 11.1	7.368
17	2 49 33.18	1.9882	13 13 33.2	11.302	17	4 26 41.73	2.0695	20 44 30.3	7.272
18	2 51 32.50	1.9892	13 24 49.1	11.231	18	4 28 45.98	2.0717	20 51 43.7	7.175
19	2 53 31.88	1.9902	13 36 0.8	11.160	19	4 30 50.35	2.0738	20 58 51.3	7.077
20	2 55 31.32	1.9912	13 47 8.3	11.088	20	4 32 54.85	2.0760	21 5 53.0	6.978
21	2 57 30.82	1.9922	13 58 11.5	11.016	21	4 34 59.48	2.0782	21 12 48.7	6.879
22	2 59 30.38	1.9932	14 9 10.3	10.944	22	4 37 4.24	2.0805	21 19 38.5	6.780
23	3 1 30.01	1.9944	14 20 4.8	10.871	23	4 39 9.13	2.0827	21 26 22.3	6.681
24	3 3 29.72	1.9957	N. 14 30 54.9	10.797	24	4 41 14.15	2.0848	N. 21 33 0.2	6.582

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SATURDAY 17.					MONDAY 19.				
0	4 41 14.15	2.0648	N.21° 33' 0.2"	6.582	0	6 23 30.93	2.1666	N.24° 45' 27.5"	1.304
1	4 43 19.30	2.0670	21 39 32.1	6.481	1	6 25 40.96	2.1675	24 46 42.3	1.187
2	4 45 24.58	2.0692	21 45 57.9	6.379	2	6 27 51.03	2.1683	24 47 50.0	1.068
3	4 47 29.99	2.0913	21 52 17.5	6.277	3	6 30 1.15	2.1691	24 48 50.5	0.950
4	4 49 35.53	2.0935	21 58 31.0	6.175	4	6 32 11.32	2.1698	24 49 44.0	0.833
5	4 51 41.20	2.0958	22 4 38.4	6.073	5	6 34 21.53	2.1705	24 50 30.5	0.717
6	4 53 46.99	2.0977	22 10 39.8	5.971	6	6 36 31.78	2.1712	24 51 10.1	0.600
7	4 55 52.91	2.0996	22 16 35.0	5.867	7	6 38 42.07	2.1718	24 51 42.6	0.482
8	4 57 58.96	2.1020	22 22 23.9	5.762	8	6 40 52.39	2.1723	24 52 7.9	0.363
9	5 0 5.14	2.1041	22 28 6.4	5.657	9	6 43 2.74	2.1728	24 52 26.0	0.244
10	5 2 11.44	2.1062	22 33 42.7	5.552	10	6 45 13.12	2.1733	24 52 37.1	0.126
11	5 4 17.87	2.1082	22 39 12.7	5.448	11	6 47 23.53	2.1737	24 52 41.1	+0.008
12	5 6 24.42	2.1102	22 44 36.5	5.343	12	6 49 33.96	2.1740	24 52 38.1	-0.110
13	5 8 31.09	2.1123	22 49 53.9	5.237	13	6 51 44.41	2.1743	24 52 27.9	0.229
14	5 10 37.89	2.1143	22 55 4.9	5.130	14	6 53 54.88	2.1746	24 52 10.6	0.347
15	5 12 44.81	2.1163	23 0 9.5	5.023	15	6 56 5.36	2.1748	24 51 46.2	0.466
16	5 14 51.85	2.1183	23 5 7.7	4.916	16	6 58 15.85	2.1750	24 51 14.7	0.584
17	5 16 59.01	2.1203	23 9 59.4	4.808	17	7 0 26.35	2.1750	24 50 36.1	0.702
18	5 19 6.28	2.1222	23 14 44.6	4.699	18	7 2 36.85	2.1750	24 49 50.4	0.821
19	5 21 13.67	2.1242	23 19 23.3	4.591	19	7 4 47.35	2.1750	24 48 57.6	0.939
20	5 23 21.18	2.1262	23 23 55.5	4.483	20	7 6 57.85	2.1750	24 47 57.7	1.058
21	5 25 28.80	2.1281	23 28 21.3	4.374	21	7 9 8.35	2.1750	24 46 50.6	1.177
22	5 27 36.53	2.1299	23 32 40.5	4.264	22	7 11 18.84	2.1748	24 45 36.4	1.296
23	5 29 44.37	2.1317	N.23 36 53.0	4.153	23	7 13 29.32	2.1745	N.24 44 15.1	1.414
SUNDAY 18.					TUESDAY 20.				
0	5 31 52.32	2.1335	N.23 40 58.8	4.042	0	7 15 39.78	2.1742	N.24 42 46.8	1.532
1	5 34 0.38	2.1352	23 44 58.0	3.932	1	7 17 50.22	2.1740	24 41 11.3	1.651
2	5 36 8.55	2.1370	23 48 50.7	3.822	2	7 20 0.65	2.1737	24 39 28.7	1.769
3	5 38 16.82	2.1387	23 52 36.7	3.711	3	7 22 11.06	2.1733	24 37 39.1	1.886
4	5 40 25.19	2.1403	23 56 16.0	3.599	4	7 24 21.44	2.1728	24 35 42.4	2.004
5	5 42 33.66	2.1420	23 59 48.5	3.486	5	7 26 31.79	2.1722	24 33 38.6	2.122
6	5 44 42.23	2.1437	24 3 14.3	3.374	6	7 28 42.10	2.1717	24 31 27.8	2.239
7	5 46 50.90	2.1453	24 6 33.4	3.261	7	7 30 52.38	2.1711	24 29 9.9	2.357
8	5 48 59.66	2.1468	24 9 45.7	3.148	8	7 33 2.62	2.1705	24 26 44.9	2.474
9	5 51 8.51	2.1483	24 12 51.1	3.034	9	7 35 12.83	2.1698	24 24 12.9	2.591
10	5 53 17.46	2.1498	24 15 49.7	2.921	10	7 37 22.99	2.1690	24 21 33.9	2.708
11	5 55 26.49	2.1513	24 18 41.6	2.808	11	7 39 33.10	2.1681	24 18 47.9	2.826
12	5 57 35.61	2.1527	24 21 26.7	2.694	12	7 41 43.17	2.1673	24 15 54.8	2.943
13	5 59 44.81	2.1542	24 24 4.9	2.579	13	7 43 53.18	2.1664	24 12 54.7	3.060
14	6 1 54.10	2.1555	24 26 36.2	2.464	14	7 46 3.14	2.1655	24 9 47.6	3.176
15	6 4 3.47	2.1568	24 29 0.5	2.349	15	7 48 13.04	2.1645	24 6 33.6	3.292
16	6 6 12.91	2.1580	24 31 18.0	2.234	16	7 50 22.88	2.1635	24 3 12.6	3.408
17	6 8 22.43	2.1593	24 33 28.6	2.119	17	7 52 32.65	2.1624	23 59 44.7	3.523
18	6 10 32.02	2.1605	24 35 32.2	2.003	18	7 54 42.36	2.1614	23 56 9.9	3.638
19	6 12 41.68	2.1617	24 37 28.9	1.887	19	7 56 52.00	2.1603	23 52 28.1	3.754
20	6 14 51.41	2.1627	24 39 18.6	1.770	20	7 59 1.57	2.1590	23 48 39.4	3.869
21	6 17 1.20	2.1637	24 41 1.3	1.654	21	8 1 11.07	2.1577	23 44 43.9	3.983
22	6 19 11.05	2.1647	24 42 37.0	1.537	22	8 3 20.49	2.1563	23 40 41.5	4.097
23	6 21 20.96	2.1657	24 44 5.7	1.420	23	8 5 29.83	2.1550	23 36 32.3	4.211
24	6 23 30.93	2.1666	N.24 45 27.5	1.304	24	8 7 39.09	2.1537	N.23 32 16.2	4.325

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
WEDNESDAY 21.					FRIDAY 23.				
0	8 7 39.09	2.1537	N.23° 32' 16.2"	4.385	0	9 48 51.52	2.0560	N.18° 2' 2.3"	9.226
1	8 9 48.26	2.1523	23 27 53.3	4.438	1	9 50 54.81	2.0538	17 52 46.1	9.314
2	8 11 57.35	2.1508	23 23 23.6	4.551	2	9 52 57.97	2.0515	17 43 24.6	9.402
3	8 14 6.35	2.1493	23 18 47.2	4.663	3	9 55 0.99	2.0492	17 33 57.9	9.488
4	8 16 15.26	2.1478	23 14 4.0	4.776	4	9 57 3.87	2.0470	17 24 26.1	9.573
5	8 18 24.08	2.1463	23 9 14.1	4.888	5	9 59 6.62	2.0447	17 14 49.2	9.657
6	8 20 32.80	2.1446	23 4 17.4	5.000	6	10 1 9.23	2.0423	17 5 7.3	9.741
7	8 22 41.43	2.1430	22 59 14.1	5.111	7	10 3 11.70	2.0400	16 55 20.4	9.824
8	8 24 49.95	2.1412	22 54 4.1	5.222	8	10 5 14.04	2.0378	16 45 28.5	9.906
9	8 26 58.37	2.1395	22 48 47.5	5.332	9	10 7 16.25	2.0357	16 35 31.7	9.988
10	8 29 6.69	2.1378	22 43 24.3	5.442	10	10 9 18.33	2.0335	16 25 30.0	10.068
11	8 31 14.90	2.1360	22 37 54.5	5.552	11	10 11 20.27	2.0312	16 15 23.5	10.148
12	8 33 23.00	2.1342	22 32 18.2	5.660	12	10 13 22.08	2.0290	16 5 12.3	10.227
13	8 35 31.00	2.1323	22 26 35.3	5.769	13	10 15 23.76	2.0269	15 54 56.3	10.306
14	8 37 38.88	2.1305	22 20 45.9	5.877	14	10 17 25.31	2.0248	15 44 35.0	10.384
15	8 39 46.65	2.1286	22 14 50.1	5.984	15	10 19 26.74	2.0227	15 34 10.3	10.460
16	8 41 54.31	2.1267	22 8 47.8	6.092	16	10 21 28.04	2.0206	15 23 40.4	10.536
17	8 44 1.85	2.1247	22 2 39.0	6.199	17	10 23 29.21	2.0185	15 13 6.0	10.612
18	8 46 9.27	2.1227	21 56 23.9	6.305	18	10 25 30.26	2.0165	15 2 27.0	10.688
19	8 48 16.57	2.1207	21 50 2.4	6.410	19	10 27 31.19	2.0144	14 51 43.6	10.760
20	8 50 23.75	2.1187	21 43 34.6	6.515	20	10 29 31.99	2.0123	14 40 55.8	10.834
21	8 52 30.81	2.1167	21 37 0.5	6.620	21	10 31 32.67	2.0103	14 30 3.6	10.906
22	8 54 37.75	2.1146	21 30 20.1	6.725	22	10 33 33.23	2.0083	14 19 7.1	10.977
23	8 56 44.56	2.1125	N.21° 23' 33.5"	6.829	23	10 35 33.68	2.0064	N.14° 8' 6.4"	11.047
THURSDAY 22.					SATURDAY 24.				
0	8 58 51.24	2.1103	N.21° 16' 40.7"	6.932	0	10 37 34.01	2.0045	N.13° 57' 1.4"	11.118
1	9 0 57.79	2.1082	21 9 41.7	7.034	1	10 39 34.23	2.0027	13 45 52.3	11.186
2	9 3 4.22	2.1061	21 2 36.6	7.136	2	10 41 34.33	2.0009	13 34 39.1	11.254
3	9 5 10.52	2.1040	20 55 25.3	7.238	3	10 43 34.32	1.9990	13 23 21.8	11.322
4	9 7 16.69	2.1018	20 48 8.0	7.338	4	10 45 34.21	1.9972	13 12 0.5	11.388
5	9 9 22.72	2.0995	20 40 44.7	7.438	5	10 47 33.99	1.9953	13 0 35.3	11.453
6	9 11 28.62	2.0973	20 33 15.3	7.539	6	10 49 33.66	1.9935	12 49 6.1	11.518
7	9 13 34.39	2.0950	20 25 39.9	7.639	7	10 51 33.22	1.9918	12 37 33.1	11.582
8	9 15 40.02	2.0928	20 17 58.6	7.737	8	10 53 32.69	1.9902	12 25 56.3	11.645
9	9 17 45.52	2.0905	20 10 11.5	7.835	9	10 55 32.06	1.9886	12 14 15.6	11.708
10	9 19 50.88	2.0883	20 2 18.5	7.933	10	10 57 31.33	1.9870	12 2 31.2	11.770
11	9 21 56.11	2.0860	19 54 19.6	8.030	11	10 59 30.51	1.9854	11 50 43.2	11.830
12	9 24 1.20	2.0837	19 46 15.0	8.126	12	11 1 29.59	1.9838	11 38 51.7	11.889
13	9 26 6.15	2.0815	19 38 4.6	8.221	13	11 3 28.58	1.9823	11 26 56.6	11.948
14	9 28 10.97	2.0792	19 29 48.5	8.316	14	11 5 27.48	1.9809	11 14 57.9	12.007
15	9 30 15.65	2.0768	19 21 26.7	8.410	15	11 7 26.30	1.9795	11 2 55.8	12.064
16	9 32 20.19	2.0745	19 12 59.3	8.504	16	11 9 25.03	1.9781	10 50 50.3	12.120
17	9 34 24.59	2.0722	19 4 26.3	8.598	17	11 11 23.68	1.9768	10 38 41.5	12.175
18	9 36 28.85	2.0699	18 55 47.8	8.688	18	11 13 22.25	1.9755	10 26 29.3	12.230
19	9 38 32.97	2.0677	18 47 3.8	8.779	19	11 15 20.74	1.9742	10 14 13.9	12.284
20	9 40 36.96	2.0654	18 38 14.3	8.871	20	11 17 19.16	1.9730	10 1 55.3	12.336
21	9 42 40.81	2.0630	18 29 19.3	8.962	21	11 19 17.50	1.9718	9 49 33.6	12.388
22	9 44 44.52	2.0607	18 20 18.9	9.051	22	11 21 15.77	1.9707	9 37 8.8	12.439
23	9 46 48.09	2.0583	18 11 13.2	9.139	23	11 23 13.98	1.9696	9 24 41.0	12.489
24	9 48 51.52	2.0560	N.18° 2' 2.3"	9.226	24	11 25 12.13	1.9685	N. 9° 12' 10.1"	12.539

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SUNDAY 25.					TUESDAY 27.				
0	11 25 12.13	1.9685	N. 9 12 10.1	12.539	0	12 59 26.78	1.9800	S. 1 28 46.4	13.799
1	11 27 10.21	1.9675	8 59 36.3	12.587	1	13 1 25.63	1.9817	1 42 34.4	13.801
2	11 29 8.23	1.9666	8 46 59.7	12.633	2	13 3 24.59	1.9835	1 56 22.5	13.802
3	11 31 6.20	1.9657	8 34 20.4	12.679	3	13 5 23.65	1.9853	2 10 10.7	13.803
4	11 33 4.12	1.9648	8 21 38.3	12.725	4	13 7 22.83	1.9879	2 23 58.8	13.801
5	11 35 1.98	1.9639	8 8 53.4	12.771	5	13 9 22.13	1.9899	2 37 46.8	13.799
6	11 36 59.79	1.9630	7 56 5.8	12.815	6	13 11 21.54	1.9912	2 51 34.6	13.795
7	11 38 57.55	1.9623	7 43 15.6	12.857	7	13 13 21.07	1.9933	3 5 22.2	13.791
8	11 40 55.28	1.9617	7 30 22.9	12.898	8	13 15 20.74	1.9955	3 19 9.5	13.786
9	11 42 52.97	1.9612	7 17 27.8	12.939	9	13 17 20.54	1.9978	3 32 56.5	13.779
10	11 44 50.62	1.9606	7 4 30.2	12.980	10	13 19 20.48	2.0000	3 46 43.0	13.771
11	11 46 48.24	1.9600	6 51 30.2	13.020	11	13 21 20.55	2.0023	4 0 29.0	13.763
12	11 48 45.83	1.9595	6 38 27.8	13.059	12	13 23 20.76	2.0047	4 14 14.5	13.753
13	11 50 43.39	1.9592	6 25 23.1	13.096	13	13 25 21.12	2.0072	4 27 59.4	13.743
14	11 52 40.93	1.9587	6 12 16.3	13.131	14	13 27 21.64	2.0098	4 41 43.6	13.730
15	11 54 38.44	1.9583	5 59 7.4	13.166	15	13 29 22.31	2.0125	4 55 27.0	13.717
16	11 56 35.94	1.9581	5 45 56.4	13.201	16	13 31 23.14	2.0152	5 9 9.6	13.703
17	11 58 33.42	1.9580	5 32 43.3	13.236	17	13 33 24.13	2.0179	5 22 51.4	13.688
18	12 0 30.89	1.9579	5 19 28.1	13.269	18	13 35 25.29	2.0207	5 36 32.2	13.672
19	12 2 28.36	1.9578	5 6 11.0	13.300	19	13 37 26.62	2.0237	5 50 12.0	13.654
20	12 4 25.82	1.9577	4 52 52.1	13.331	20	13 39 28.13	2.0267	6 3 50.7	13.635
21	12 6 23.27	1.9576	4 39 31.3	13.361	21	13 41 29.82	2.0297	6 17 28.2	13.615
22	12 8 20.73	1.9577	4 26 8.7	13.390	22	13 43 31.69	2.0327	6 31 4.5	13.594
23	12 10 18.19	1.9577	N. 4 12 44.5	13.418	23	13 45 33.75	2.0358	S. 6 44 39.5	13.572
MONDAY 26.					WEDNESDAY 28.				
0	12 12 15.66	1.9578	N. 3 59 18.6	13.445	0	13 47 35.99	2.0390	S. 6 58 13.2	13.549
1	12 14 13.14	1.9581	3 45 51.1	13.471	1	13 49 38.43	2.0423	7 11 45.4	13.525
2	12 16 10.64	1.9584	3 32 22.1	13.497	2	13 51 41.08	2.0457	7 25 16.1	13.500
3	12 18 8.16	1.9588	3 18 51.5	13.521	3	13 53 43.93	2.0492	7 38 45.3	13.473
4	12 20 5.70	1.9592	3 5 19.5	13.544	4	13 55 46.98	2.0527	7 52 12.8	13.444
5	12 22 3.27	1.9597	2 51 46.2	13.565	5	13 57 50.25	2.0562	8 5 38.6	13.415
6	12 24 0.86	1.9602	2 38 11.7	13.586	6	13 59 53.73	2.0598	8 19 2.7	13.385
7	12 25 58.49	1.9608	2 24 35.9	13.607	7	14 1 57.43	2.0635	8 32 24.9	13.354
8	12 27 56.16	1.9614	2 10 58.9	13.627	8	14 4 1.36	2.0673	8 45 45.1	13.321
9	12 29 53.86	1.9620	1 57 20.7	13.646	9	14 6 5.51	2.0711	8 59 3.4	13.287
10	12 31 51.61	1.9628	1 43 41.4	13.663	10	14 8 9.89	2.0750	9 12 19.6	13.252
11	12 33 49.41	1.9637	1 30 1.2	13.679	11	14 10 14.51	2.0789	9 25 33.6	13.215
12	12 35 47.26	1.9647	1 16 20.0	13.695	12	14 12 19.36	2.0828	9 38 45.4	13.178
13	12 37 45.17	1.9656	1 2 37.9	13.709	13	14 14 24.45	2.0869	9 51 54.9	13.139
14	12 39 43.13	1.9665	0 48 55.0	13.722	14	14 16 29.79	2.0911	10 5 2.1	13.099
15	12 41 41.15	1.9675	0 35 11.3	13.734	15	14 18 35.39	2.0953	10 18 6.8	13.057
16	12 43 39.24	1.9686	0 21 26.9	13.745	16	14 20 41.24	2.0995	10 31 9.0	13.015
17	12 45 37.40	1.9698	N. 0 7 41.9	13.755	17	14 22 47.35	2.1038	10 44 8.6	12.971
18	12 47 35.63	1.9711	S. 0 6 3.7	13.765	18	14 24 53.71	2.1089	10 57 5.5	12.925
19	12 49 33.94	1.9725	0 19 49.8	13.773	19	14 27 0.34	2.1127	11 9 59.7	12.879
20	12 51 32.33	1.9738	0 33 36.4	13.781	20	14 29 7.24	2.1179	11 22 51.0	12.831
21	12 53 30.81	1.9753	0 47 23.5	13.787	21	14 31 14.41	2.1218	11 35 39.5	12.783
22	12 55 29.37	1.9768	1 1 10.9	13.792	22	14 33 21.86	2.1265	11 48 25.0	12.733
23	12 57 28.03	1.9783	1 14 58.5	13.796	23	14 35 29.59	2.1312	12 1 7.5	12.688
24	12 59 26.78	1.9800	S. 1 28 46.4	13.799	24	14 37 37.59	2.1359	S. 12 13 46.8	12.639

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
THURSDAY 29.					FRIDAY, MARCH 1.				
0	<sup>h</sup> 14 <sup>m</sup> 37 <sup>s</sup> 37.59	2.1359	S. 12° 13' 46.8"	12.629	0	<sup>h</sup> 15 <sup>m</sup> 30 <sup>s</sup> 22.89	2.2648	S. 16° 58' 22.7"	10.957
1	14 39 45.88	2.1407	12 26 22.9	12.575	PHASES OF THE MOON.				
2	14 41 54.47	2.1455	12 38 55.7	12.520					
3	14 44 3.35	2.1504	12 51 25.2	12.463					
4	14 46 12.53	2.1553	13 3 51.2	12.404	☾ Last Quarter, . . . <sup>d</sup> 1 <sup>h</sup> 22 <sup>m</sup> 10.6 ● New Moon, . . . 8 13 52.1 ☾ First Quarter, . . . 15 18 24.1 ○ Full Moon, . . . 23 22 56.4				
5	14 48 22.00	2.1603	13 16 13.7	12.345					
6	14 50 31.77	2.1653	13 28 32.6	12.284					
7	14 52 41.85	2.1707	13 40 47.8	12.222	☾ Perigee, . . . . . <sup>d</sup> 7 <sup>h</sup> 2.3 ☾ Apogee, . . . . . 19 2.4				
8	14 54 52.24	2.1758	13 52 59.2	12.159					
9	14 57 2.95	2.1810	14 5 6.8	12.095					
10	14 59 13.97	2.1863	14 17 10.5	12.028					
11	15 1 25.31	2.1917	14 29 10.1	11.960					
12	15 3 36.97	2.1971	14 41 5.7	11.892					
13	15 5 48.96	2.2024	14 52 57.1	11.821					
14	15 8 1.27	2.2078	15 4 44.2	11.749					
15	15 10 13.91	2.2133	15 16 27.0	11.676					
16	15 12 26.88	2.2189	15 28 5.3	11.601					
17	15 14 40.19	2.2245	15 39 39.1	11.526					
18	15 16 53.83	2.2302	15 51 8.4	11.449					
19	15 19 7.81	2.2358	16 2 33.0	11.370					
20	15 21 22.13	2.2415	16 13 52.8	11.289					
21	15 23 36.80	2.2473	16 25 7.7	11.207					
22	15 25 51.81	2.2531	16 36 17.7	11.125					
23	15 28 7.17	2.2590	16 47 22.7	11.041					
24	15 30 22.89	2.2648	S. 16° 58' 22.7"	10.957					

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
1	Pollux W.	98° 28' 58"	2557	100° 8' 52"	2545	101° 49' 3"	2532	103° 29' 32"	2519
	Jupiter W.	97 43 48	2511	99 24 46	2499	101 6 1	2486	102 47 34	2473
	Regulus W.	62 27 41	2562	64 7 28	2548	65 47 34	2535	67 27 59	2522
	Antares E.	38 24 13	2603	36 45 22	2594	35 6 19	2587	33 27 6	2580
	Venus E.	61 6 50	2961	59 35 48	2946	58 4 28	2932	56 32 50	2919
	Saturn E.	75 10 6	2587	73 30 53	2574	71 51 23	2561	70 11 35	2548
	SUN E.	101 29 27	2901	99 57 9	2887	98 24 33	2873	96 51 39	2859
2	Regulus W.	75 54 46	2453	77 37 6	2439	79 19 45	2425	81 2 44	2411
	Spica W.	22 29 26	2619	24 7 55	2583	25 47 13	2552	27 27 14	2523
	Venus E.	48 50 12	2847	47 16 45	2832	45 42 59	2818	44 8 55	2804
	Saturn E.	61 47 55	2481	60 6 15	2467	58 24 15	2453	56 41 56	2440
	α Aquilæ E.	76 18 10	3238	74 52 46	3228	73 27 22	3229	72 1 59	3242
	SUN E.	89 2 32	2786	87 27 46	2771	85 52 40	2756	84 17 15	2741
3	Regulus W.	89 42 38	2342	91 27 37	2328	93 12 55	2314	94 58 34	2301
	Spica W.	35 56 20	2406	37 39 56	2387	39 23 50	2368	41 8 11	2350
	Venus E.	36 13 52	2733	34 37 56	2719	33 1 42	2706	31 25 10	2694
	Saturn E.	48 5 30	2372	46 21 15	2359	44 36 41	2345	42 51 47	2332
	α Aquilæ E.	64 56 36	3284	63 32 6	3301	62 7 56	3320	60 44 8	3343
	SUN E.	76 15 16	2668	74 37 53	2654	73 0 11	2639	71 22 9	2625
4	Regulus W.	103 51 37	2237	105 39 10	2224	107 27 2	2212	109 15 11	2200
	Spica W.	49 56 9	2268	51 42 55	2254	53 30 2	2240	55 17 30	2227
	Saturn E.	34 2 41	2272	32 16 0	2260	30 29 2	2249	28 41 48	2240
	α Aquilæ E.	53 53 10	3522	52 33 10	3574	51 14 7	3634	49 56 9	3702
	SUN E.	63 7 14	2556	61 27 19	2544	59 47 7	2531	58 6 37	2520
5	Spica W.	64 19 42	2165	66 9 2	2155	67 58 38	2144	69 48 30	2135
	Antares W.	18 49 31	2326	20 34 53	2284	22 21 16	2251	24 8 27	2224
	SUN E.	49 40 8	2465	47 58 6	2456	46 15 51	2448	44 33 24	2439
6	Spica W.	79 1 9	2096	80 52 15	2090	82 43 30	2085	84 34 53	2079
	Antares W.	33 12 50	2135	35 2 56	2124	36 53 19	2113	38 43 58	2105
	SUN E.	35 58 41	2412	34 15 24	2410	32 32 4	2406	30 48 41	2409
10	SUN W.	20 5 39	2634	21 43 48	2635	23 21 55	2640	24 59 56	2647
	α Arietis E.	57 2 51	2391	55 19 4	2414	53 35 49	2438	51 53 8	2463
	Aldebaran E.	86 56 28	2227	85 8 41	2242	83 21 16	2257	81 34 13	2272
11	SUN W.	33 6 37	2710	34 43 4	2725	36 19 10	2741	37 54 55	2758
	α Arietis E.	43 29 16	2614	41 50 40	2630	40 12 53	2649	38 35 58	2722
	Aldebaran E.	72 44 53	2356	71 0 15	2373	69 16 2	2392	67 32 16	2410
	Jupiter E.	116 37 45	2315	114 52 7	2339	113 6 54	2350	111 22 7	2367
	Pollux E.	116 54 29	2355	115 9 49	2372	113 25 34	2389	111 41 44	2406
12	SUN W.	45 47 58	2848	47 21 23	2866	48 54 25	2885	50 27 3	2905
	α Pegasi W.	29 26 40	5039	30 23 5	4795	31 22 45	4594	32 25 15	4424
	Mars W.	23 27 17	2814	25 1 27	2826	26 35 21	2839	28 8 58	2853
	Aldebaran E.	58 59 55	2504	57 18 47	2522	55 38 5	2542	53 57 50	2561
	Jupiter E.	102 44 35	2458	101 2 22	2476	99 20 35	2494	97 39 13	2519
	Pollux E.	103 8 48	2496	101 27 29	2515	99 46 36	2533	98 6 8	2551
13	SUN W.	58 4 8	2999	59 34 22	3018	61 4 12	3037	62 33 39	3055
	α Pegasi W.	38 9 40	3883	39 23 17	3816	40 38 3	3758	41 53 49	3708

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Diff.	XV <sup>h</sup> .	P. L. of Diff.	XVIII <sup>h</sup> .	P. L. of Diff.	XXI <sup>h</sup> .	P. L. of Diff.
1	Pollux W.	105° 10' 19"	2506	106° 51' 24"	2492	108° 32' 48"	2479	110° 14' 31"	2465
	Jupiter W.	104 29 26	2460	106 11 36	2446	107 54 5	2433	109 36 53	2420
	Regulus W.	69 8 42	2508	70 49 44	2494	72 31 5	2480	74 12 46	2467
	Antares E.	31 47 44	2574	30 8 13	2570	28 28 37	2567	26 48 57	2567
	Venus E.	55 0 55	2905	53 28 42	2890	51 56 10	2876	50 23 20	2862
	Saturn E.	68 31 28	2535	66 51 3	2521	65 10 19	2507	63 29 16	2494
	SUN E.	95 18 27	2644	93 44 56	2630	92 11 7	2615	90 36 59	2601
2	Regulus W.	82 46 3	2397	84 29 42	2384	86 13 40	2369	87 57 59	2355
	Spica W.	29 7 55	2497	30 49 13	2471	32 31 7	2448	34 13 33	2426
	Venus E.	42 34 32	2789	40 59 50	2775	39 24 49	2761	37 49 30	2747
	Saturn E.	54 59 18	2426	53 16 20	2412	51 33 3	2398	49 49 26	2385
	α Aquilæ E.	70 36 40	2946	69 11 25	2953	67 46 18	2961	66 21 21	2971
	SUN E.	82 41 30	2737	81 5 26	2719	79 29 2	2698	77 52 19	2683
3	Regulus W.	96 44 32	2288	98 30 49	2274	100 17 26	2260	102 4 22	2249
	Spica W.	42 52 58	2333	44 38 10	2316	46 23 46	2300	48 9 46	2284
	Venus E.	29 48 22	2681	28 11 17	2669	26 33 56	2658	24 56 20	2647
	Saturn E.	41 6 34	2319	39 21 2	2307	37 35 12	2295	35 49 5	2282
	α Aquilæ E.	59 20 46	2370	57 57 55	2400	56 35 38	2435	55 14 1	2476
	SUN E.	69 43 48	2610	68 5 7	2597	66 26 8	2583	64 46 50	2570
4	Regulus W.	111 3 38	2189	112 52 22	2178	114 41 22	2168	116 30 38	2158
	Spica W.	57 5 18	2213	58 53 26	2200	60 41 53	2188	62 30 39	2176
	Saturn E.	26 54 20	2231	25 6 38	2223	23 18 45	2216	21 30 42	2211
	α Aquilæ E.	48 39 24	2779	47 24 0	2806	46 10 6	2835	44 57 52	2879
	SUN E.	56 25 51	2507	54 44 48	2497	53 3 30	2485	51 21 56	2475
5	Spica W.	71 38 36	2126	73 28 56	2118	75 19 28	2109	77 10 13	2102
	Antares W.	25 56 19	2200	27 44 46	2181	29 33 42	2163	31 23 5	2149
	SUN E.	42 50 45	2439	41 7 56	2426	39 24 58	2421	37 41 53	2416
6	Spica W.	86 26 24	2076	88 18 0	2072	90 9 42	2070	92 1 27	2069
	Antares W.	40 34 50	2097	42 25 54	2090	44 17 8	2085	46 8 31	2081
	SUN E.	29 5 19	2411	27 22 0	2414	25 38 45	2419	23 55 38	2431
10	SUN W.	26 37 47	2657	28 15 25	2669	29 52 47	2682	31 29 51	2695
	α Arietis E.	50 11 3	2489	48 29 35	2517	46 48 46	2548	45 8 39	2580
	Aldebaran E.	79 47 33	2289	78 1 17	2304	76 15 24	2322	74 29 56	2339
11	SUN W.	39 30 18	2775	41 5 18	2793	42 39 55	2811	44 14 8	2829
	α Arietis E.	37 0 0	2778	35 25 3	2828	33 51 12	2883	32 18 32	2943
	Aldebaran E.	65 48 55	2428	64 6 0	2447	62 23 32	2465	60 41 30	2485
	Jupiter E.	109 37 45	2385	107 53 49	2403	106 10 19	2421	104 27 14	2439
	Pollux E.	109 58 18	2424	108 15 17	2442	106 32 42	2460	104 50 32	2478
12	SUN W.	51 59 16	2924	53 31 5	2942	55 2 30	2962	56 33 31	2981
	α Pegasi W.	33 30 15	2980	34 37 26	4157	35 46 33	4051	36 57 22	3961
	Mars W.	29 42 17	2968	31 15 17	2983	32 47 57	2990	34 20 16	2916
	Aldebaran E.	52 18 1	2580	50 38 39	2599	48 59 43	2619	47 21 14	2638
	Jupiter E.	95 58 17	2530	94 17 46	2548	92 37 40	2567	90 58 0	2585
	Pollux E.	96 26 6	2569	94 46 28	2588	93 7 16	2606	91 28 29	2624
13	SUN W.	64 2 44	3073	65 31 26	3091	66 59 46	3110	68 27 44	3128
	α Pegasi W.	43 10 28	3664	44 27 53	3628	45 45 57	3597	47 4 35	3569



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## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.		Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
13	Mars	W.	35° 52' 15"	2832	37° 23' 53"	2949	38° 55' 10"	2965	40° 26' 6"	2983
	Aldebaran	E.	45 43 11	2857	44 5 34	2877	42 28 23	2896	40 51 38	2716
	Jupiter	E.	89 18 45	2804	87 39 55	2821	86 1 29	2839	84 23 27	2856
	Pollux	E.	89 50 6	2841	88 12 7	2860	86 34 33	2877	84 57 22	2895
14	SUN	W.	69 55 20	3144	71 22 36	3162	72 49 31	3178	74 16 6	3195
	α Pegasi	W.	48 23 43	3545	49 43 17	3586	51 3 12	3509	52 23 26	3495
	Mars	W.	47 55 30	3065	49 24 22	3082	50 52 54	3097	52 21 7	3113
	Aldebaran	E.	32 54 25	2815	31 20 16	2835	29 46 34	2856	28 13 19	2877
	Jupiter	E.	76 18 59	2740	74 43 12	2756	73 7 46	2772	71 32 41	2786
	Pollux	E.	76 57 13	2779	75 22 17	2795	73 47 42	2811	72 13 28	2826
15	SUN	W.	81 24 18	3271	82 49 3	3285	84 13 32	3299	85 37 45	3312
	Mars	W.	59 37 38	3185	61 4 5	3198	62 30 16	3212	63 56 11	3225
	α Pegasi	W.	59 7 48	3453	60 29 5	3449	61 50 26	3446	63 11 51	3443
	Jupiter	E.	63 42 3	2858	62 8 50	2871	60 35 54	2883	59 3 14	2896
	Pollux	E.	64 27 8	2898	62 54 47	2911	61 22 42	2924	59 50 54	2936
	Regulus	E.	100 29 53	2898	98 57 31	2911	97 25 26	2923	95 53 36	2935
16	SUN	W.	92 35 11	3372	93 58 0	3381	95 20 38	3392	96 43 4	3400
	Mars	W.	71 2 16	3281	72 26 50	3290	73 51 13	3300	75 15 24	3309
	Jupiter	E.	51 23 38	2951	49 52 24	2961	48 21 22	2970	46 50 32	2979
	Pollux	E.	52 15 40	2994	50 45 20	3004	49 15 12	3014	47 45 16	3023
	Regulus	E.	88 18 5	2989	86 47 38	2998	85 17 23	3008	83 47 20	3016
17	SUN	W.	103 32 47	3440	104 54 18	3447	106 15 41	3453	107 36 58	3459
	Mars	W.	82 13 58	3346	83 37 16	3352	85 0 27	3358	86 23 32	3363
	α Arietis	W.	37 14 28	3373	38 37 15	3359	40 0 18	3345	41 23 37	3333
	Jupiter	E.	39 18 56	3017	37 49 4	3023	36 19 20	3039	34 49 43	3034
	Pollux	E.	40 18 23	3065	38 49 30	3073	37 20 47	3079	35 52 12	3087
	Regulus	E.	76 19 31	3052	74 50 23	3059	73 21 23	3064	71 52 29	3069
18	SUN	W.	114 21 59	3480	115 42 46	3481	117 3 31	3484	118 24 13	3486
	Mars	W.	93 17 39	3381	94 40 17	3383	96 2 53	3386	97 25 26	3386
	α Arietis	W.	48 23 19	3288	49 47 45	3280	51 12 20	3274	52 37 2	3267
	Jupiter	E.	27 23 15	3058	25 54 14	3061	24 25 17	3065	22 56 25	3069
	Pollux	E.	28 31 23	3122	27 3 38	3128	25 36 2	3136	24 8 35	3143
	Regulus	E.	64 29 19	3087	63 0 53	3090	61 32 31	3091	60 4 11	3094
19	SUN	W.	125 7 22	3488	126 27 59	3488	127 48 36	3488	129 9 14	3487
	α Arietis	W.	59 42 24	3237	61 7 49	3231	62 33 21	3225	63 59 0	3220
	Aldebaran	W.	28 9 39	3134	29 37 7	3128	31 4 43	3122	32 32 26	3116
	Regulus	E.	52 42 55	3096	51 14 41	3096	49 46 26	3096	48 18 11	3094
	Spica	E.	106 45 16	3105	105 17 13	3103	103 49 7	3101	102 20 59	3100
20	α Arietis	W.	71 8 58	3190	72 35 19	3183	74 1 48	3178	75 28 24	3172
	Aldebaran	W.	39 52 42	3088	41 21 6	3082	42 49 37	3077	44 18 15	3071
	Regulus	E.	40 56 28	3086	39 28 1	3084	37 59 32	3082	36 31 0	3079
	Spica	E.	94 59 32	3083	93 31 2	3079	92 2 27	3075	90 33 47	3070
21	α Arietis	W.	82 43 18	3138	84 10 41	3132	85 38 12	3125	87 5 51	3119
	Aldebaran	W.	51 43 18	3039	53 12 43	3032	54 42 16	3025	56 11 58	3018
	Regulus	E.	29 7 41	3071	27 38 56	3070	26 10 10	3070	24 41 24	3072
	Spica	E.	83 8 56	3044	81 39 38	3038	80 10 12	3032	78 40 39	3026

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Day of the Month.	Star's Name and Position.		Midnight.	P. L. of Diff.	XV <sup>h</sup> .	P. L. of Diff.	XVIII <sup>h</sup> .	P. L. of Diff.	XXI <sup>h</sup> .	P. L. of Diff.
13	Mars	W.	41 56 40	3000	43 26 53	3016	44 56 46	3033	46 26 18	3049
	Aldebaran	E.	39 15 20	2736	37 39 28	2755	36 4 1	2775	34 29 0	2795
	Jupiter	E.	82 45 48	2673	81 8 32	2690	79 31 39	2707	77 55 8	2723
	Pollux	E.	83 20 35	2712	81 44 11	2729	80 8 9	2746	78 32 30	2763
14	SUN	W.	75 42 21	3210	77 8 18	3226	78 33 56	3242	79 59 16	3257
	α Pegasi	W.	53 43 56	3483	55 4 39	3472	56 25 34	3465	57 46 37	3458
	Mars	W.	53 49 1	3129	55 16 36	3143	56 43 54	3158	58 10 54	3171
	Aldebaran	E.	26 40 31	2900	25 8 12	2893	23 36 22	2847	22 5 3	2873
	Jupiter	E.	69 57 55	2801	68 23 29	2816	66 49 22	2830	65 15 33	2845
	Pollux	E.	70 39 34	2841	69 5 59	2856	67 32 44	2870	65 59 47	2884
15	SUN	W.	87 1 43	3385	88 25 26	3338	89 48 54	3349	91 12 9	3360
	Mars	W.	65 21 51	3236	66 47 18	3247	68 12 31	3259	69 37 30	3270
	α Pegasi	W.	64 33 19	3449	65 54 48	3441	67 16 18	3441	68 37 48	3442
	Jupiter	E.	57 30 50	2906	55 58 41	2919	54 26 46	2930	52 55 5	2941
	Pollux	E.	58 19 21	2949	56 48 4	2961	55 17 2	2972	53 46 14	2983
	Regulus	E.	94 22 2	2946	92 50 42	2958	91 19 37	2969	89 48 45	2978
16	SUN	W.	98 5 20	3409	99 27 26	3418	100 49 22	3426	102 11 9	3434
	Mars	W.	76 39 25	3317	78 3 17	3325	79 26 59	3332	80 50 33	3340
	Jupiter	E.	45 19 53	2988	43 49 25	2995	42 19 6	3003	40 48 57	3009
	Pollux	E.	46 15 32	3032	44 45 59	3041	43 16 37	3049	41 47 25	3057
	Regulus	E.	82 17 27	3094	80 47 44	3032	79 18 11	3039	77 48 47	3046
17	SUN	W.	108 58 8	3463	110 19 13	3468	111 40 13	3472	113 1 8	3476
	Mars	W.	87 46 31	3368	89 9 24	3372	90 32 13	3375	91 54 58	3379
	α Arietis	W.	42 47 10	3322	44 10 56	3312	45 34 54	3303	46 59 2	3295
	Jupiter	E.	33 20 13	3039	31 50 49	3045	30 21 32	3050	28 52 21	3054
	Pollux	E.	34 23 46	3093	32 55 28	3100	31 27 18	3106	29 59 16	3114
	Regulus	E.	70 23 41	3073	68 54 58	3078	67 26 21	3081	65 57 48	3084
18	SUN	W.	119 44 53	3487	121 5 32	3488	122 26 9	3488	123 46 46	3489
	Mars	W.	98 47 58	3387	100 10 29	3388	101 32 59	3388	102 55 29	3387
	α Arietis	W.	54 1 52	3261	55 26 49	3254	56 51 54	3248	58 17 6	3243
	Jupiter	E.	21 27 38	3073	19 58 56	3078	18 30 19	3069	17 1 48	3067
	Pollux	E.	22 41 18	3153	21 14 13	3164	19 47 21	3178	18 20 45	3193
	Regulus	E.	58 35 54	3095	57 7 38	3096	55 39 23	3096	54 11 9	3096
19	SUN	W.	130 29 53	3485	131 50 34	3483	133 11 17	3481	134 32 2	3479
	α Arietis	W.	65 24 46	3214	66 50 39	3209	68 16 38	3203	69 42 44	3196
	Aldebaran	W.	34 0 16	3110	35 28 13	3105	36 56 16	3100	38 24 26	3095
	Regulus	E.	46 49 54	3092	45 21 35	3091	43 53 15	3090	42 24 53	3087
	Spica	E.	100 52 49	3096	99 24 35	3094	97 56 18	3091	96 27 57	3087
20	α Arietis	W.	76 55 7	3165	78 21 58	3158	79 48 57	3159	81 16 4	3146
	Aldebaran	W.	45 47 0	3065	47 15 53	3059	48 44 53	3059	50 14 1	3045
	Regulus	E.	35 2 25	3078	33 33 48	3075	32 5 8	3073	30 36 25	3072
	Spica	E.	89 5 1	3065	87 36 9	3060	86 7 11	3056	84 38 7	3050
21	α Arietis	W.	88 33 38	3111	90 1 34	3105	91 29 38	3097	92 57 51	3091
	Aldebaran	W.	57 41 49	3010	59 11 49	3002	60 41 59	2995	62 12 18	2988
	Regulus	E.	23 12 40	3073	21 43 58	3079	20 15 23	3087	18 46 58	3090
	Spica	E.	77 10 58	3019	75 41 9	3013	74 11 12	3008	72 41 7	2999

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## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Diff.	III <sup>h</sup> .	P. L. of Diff.	VI <sup>h</sup> .	P. L. of Diff.	IX <sup>h</sup> .	P. L. of Diff.
22	$\alpha$ Arietis	W. 94 26 12	3063	95 54 42	3077	97 23 20	3070	98 52 6	3063
	Aldebaran	W. 63 42 46	2980	65 13 24	2972	66 44 12	2964	68 15 10	2956
	Jupiter	W. 20 42 51	2962	22 13 52	2951	23 45 6	2942	25 16 32	2932
	Pollux	W. 19 43 56	3050	21 13 7	3031	22 42 41	3014	24 12 37	2999
	Spica	E. 71 10 53	2993	69 40 31	2985	68 10 0	2978	66 39 20	2971
23	Aldebaran	W. 75 52 35	2914	77 24 36	2906	78 56 47	2897	80 29 10	2889
	Jupiter	W. 32 56 40	2887	34 29 16	2877	36 2 4	2869	37 35 3	2859
	Pollux	W. 31 46 33	2936	33 18 6	2924	34 49 54	2913	36 21 56	2903
	Spica	E. 59 3 47	2936	57 32 14	2928	56 0 31	2921	54 28 39	2915
	Antares	E. 104 56 15	2921	103 24 23	2912	101 52 20	2904	100 20 6	2895
24	Aldebaran	W. 88 13 47	2945	89 47 16	2937	91 20 56	2928	92 54 47	2919
	Jupiter	W. 45 22 50	2915	46 56 58	2907	48 31 17	2798	50 5 47	2789
	Pollux	W. 44 5 23	2852	45 38 43	2843	47 12 15	2833	48 46 0	2824
	Spica	E. 46 47 11	2881	45 14 28	2876	43 41 38	2870	42 8 41	2865
	Antares	E. 92 36 8	2852	91 2 47	2843	89 29 15	2834	87 55 31	2825
25	Jupiter	W. 58 1 11	2746	59 36 50	2738	61 12 40	2729	62 48 42	2720
	Pollux	W. 56 37 50	2777	58 12 48	2768	59 47 58	2759	61 23 20	2750
	Regulus	W. 20 48 7	2850	22 21 30	2832	23 55 16	2815	25 29 25	2799
	Spica	E. 34 22 26	2847	32 48 59	2846	31 15 31	2845	29 42 2	2848
	Antares	E. 80 4 5	2782	78 29 14	2775	76 54 12	2766	75 19 0	2758
	Saturn	E. 119 32 11	2801	117 57 44	2792	116 23 5	2783	114 48 15	2774
26	Jupiter	W. 70 51 40	2678	72 28 50	2669	74 6 11	2661	75 43 43	2653
	Pollux	W. 69 23 9	2705	70 59 42	2696	72 36 27	2688	74 13 23	2679
	Regulus	W. 33 24 59	2732	35 0 57	2720	36 37 10	2710	38 13 37	2698
	Antares	E. 67 20 15	2716	65 43 57	2709	64 7 29	2701	62 30 51	2693
	Saturn	E. 106 51 10	2730	105 15 10	2722	103 38 59	2713	102 2 36	2704
	Venus	E. 120 24 7	3135	118 56 40	3126	117 29 2	3116	116 1 12	3107
27	Jupiter	W. 83 54 11	2612	85 32 50	2604	87 11 40	2595	88 50 42	2587
	Pollux	W. 82 20 57	2637	83 59 2	2626	85 37 19	2620	87 15 47	2612
	Regulus	W. 46 19 21	2649	47 57 10	2640	49 35 11	2630	51 13 25	2621
	Antares	E. 54 25 6	2657	52 47 28	2649	51 9 40	2643	49 31 43	2635
	Saturn	E. 93 57 51	2662	92 20 20	2653	90 42 37	2645	89 4 43	2636
	$\alpha$ Aquilæ	E. 101 21 39	3402	99 59 25	3386	98 36 53	3372	97 14 4	3358
	Venus	E. 108 39 10	3060	107 10 11	3050	105 41 0	3041	104 11 38	3032
28	Jupiter	W. 97 8 39	2546	98 48 48	2538	100 29 8	2530	102 9 40	2522
	Pollux	W. 95 30 58	2570	97 10 34	2561	98 50 22	2553	100 30 21	2545
	Regulus	W. 59 27 42	2576	61 7 10	2567	62 46 50	2559	64 26 42	2549
	Antares	E. 41 19 45	2606	39 40 58	2601	38 2 4	2596	36 23 4	2592
	Saturn	E. 80 52 21	2594	79 13 18	2586	77 34 4	2578	75 54 39	2569
	$\alpha$ Aquilæ	E. 90 16 26	3305	88 52 20	3298	87 28 6	3292	86 3 45	3286
	Venus	E. 96 41 57	2986	95 11 27	2977	93 40 45	2968	92 9 52	2958
	SUN	E. 131 39 39	2930	130 7 58	2920	128 36 4	2909	127 3 57	2900
29	Regulus	W. 72 49 5	2507	74 30 9	2497	76 11 26	2489	77 52 55	2480
	Spica	W. 19 28 35	2714	21 4 56	2674	22 42 11	2641	24 20 10	2612
	Saturn	E. 67 34 40	2598	65 54 6	2590	64 13 20	2512	62 32 23	2503
	$\alpha$ Aquilæ	E. 79 0 51	3276	77 36 12	3279	76 11 36	3262	74 47 4	3268
	Venus	E. 84 32 33	2912	83 0 30	2904	81 28 16	2894	79 55 50	2886
	SUN	E. 119 20 13	2850	117 46 50	2841	116 13 15	2831	114 39 28	2821

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
22	$\alpha$ Arietis W.	100° 21' 1"	3056	101° 50' 4"	3049	103° 19' 16"	3043	104° 48' 36"	3037
	Aldebaran W.	60 46 18	2948	71 17 36	2939	72 49 5	2931	74 20 45	2923
	Jupiter W.	26 48 10	2923	28 20 0	2913	29 52 2	2905	31 24 15	2895
	Pollux W.	25 42 51	2985	27 13 23	2972	28 44 11	2960	30 15 14	2947
	Spica E.	65 8 31	2965	63 37 34	2957	62 6 27	2950	60 35 12	2942
23	Aldebaran W.	82 1 43	2980	83 34 28	2972	85 7 23	2963	86 40 29	2954
	Jupiter W.	30 8 14	2951	40 41 36	2942	42 15 9	2933	43 48 54	2925
	Pollux W.	37 54 11	2993	39 26 39	2982	40 59 21	2972	42 32 16	2962
	Spica E.	52 56 39	2906	51 24 30	2901	49 52 12	2894	48 19 46	2887
	Antares E.	98 47 41	2887	97 15 5	2877	95 42 17	2869	94 9 18	2860
24	Aldebaran W.	94 28 50	2911	96 3 4	2902	97 37 29	2794	99 12 5	2785
	Jupiter W.	51 40 29	2781	53 15 22	2772	54 50 27	2763	56 25 43	2754
	Pollux W.	50 19 57	2914	51 54 7	2905	53 28 29	2795	55 3 3	2785
	Spica E.	40 35 37	2960	39 2 27	2955	37 29 11	2952	35 55 50	2949
	Antares E.	86 21 36	2917	84 47 30	2908	83 13 13	2900	81 38 45	2791
25	Jupiter W.	64 24 55	2712	66 1 19	2703	67 37 55	2695	69 14 42	2687
	Pollux W.	62 58 54	2741	64 34 40	2732	66 10 38	2722	67 46 48	2714
	Regulus W.	27 3 54	2784	28 38 43	2769	30 13 51	2756	31 49 17	2744
	Spica E.	28 8 36	2952	26 35 15	2958	25 2 2	2966	23 29 0	2979
	Antares E.	73 43 37	2750	72 8 3	2741	70 32 18	2733	68 56 22	2725
	Saturn E.	113 13 13	2766	111 38 0	2756	110 2 35	2747	108 26 58	2739
26	Jupiter W.	77 21 26	2645	78 59 20	2636	80 37 26	2628	82 15 43	2620
	Pollux W.	75 50 31	2671	77 27 50	2662	79 5 21	2654	80 43 3	2645
	Regulus W.	39 50 19	2689	41 27 14	2678	43 4 23	2669	44 41 45	2658
	Antares E.	60 54 2	2696	59 17 3	2678	57 39 54	2671	56 2 35	2663
	Saturn E.	100 26 2	2695	98 49 16	2687	97 12 19	2679	95 35 11	2670
	Venus E.	114 33 11	3097	113 4 58	3088	111 36 34	3078	110 7 58	3069
27	Jupiter W.	90 29 55	2579	92 9 19	2571	93 48 54	2563	95 28 41	2554
	Pollux W.	88 54 26	2603	90 33 17	2595	92 12 19	2586	93 51 33	2578
	Regulus W.	52 51 52	2612	54 30 31	2603	56 9 22	2593	57 48 26	2585
	Antares E.	47 53 36	2629	46 15 21	2622	44 36 57	2617	42 58 25	2611
	Saturn E.	87 26 37	2628	85 48 20	2620	84 9 52	2611	82 31 12	2603
	$\alpha$ Aquilæ E.	95 50 59	3345	94 27 40	3333	93 4 7	3323	91 40 22	3313
	Venus E.	102 42 5	3092	101 12 20	3014	99 42 24	3004	98 12 16	2995
28	Jupiter W.	103 50 23	2514	105 31 17	2505	107 12 23	2497	108 53 40	2489
	Pollux W.	102 10 32	2537	103 50 54	2529	105 31 27	2521	107 12 11	2512
	Regulus W.	66 6 47	2541	67 47 3	2532	69 27 32	2524	71 8 12	2515
	Antares E.	34 43 58	2589	33 4 48	2586	31 25 34	2585	29 46 18	2585
	Saturn E.	74 15 2	2561	72 35 14	2553	70 55 14	2545	69 15 3	2536
	$\alpha$ Aquilæ E.	84 39 17	3292	83 14 45	3279	81 50 9	3276	80 25 30	3276
	Venus E.	90 38 47	2950	89 7 31	2940	87 36 3	2931	86 4 24	2922
	Sun E.	125 31 38	2990	123 59 6	2980	122 26 21	2969	120 53 23	2960
29	Regulus W.	79 34 36	2472	81 16 28	2463	82 58 33	2455	84 40 50	2446
	Spica W.	25 58 48	2588	27 38 0	2585	29 17 43	2545	30 57 53	2537
	Saturn E.	60 51 14	2494	59 9 53	2487	57 28 21	2478	55 46 37	2470
	$\alpha$ Aquilæ E.	73 22 38	3294	71 58 19	3292	70 34 10	3212	69 10 12	3293
	Venus E.	78 23 13	2976	76 50 24	2967	75 17 23	2959	73 44 11	2949
	Sun E.	113 5 28	2912	111 31 16	2902	109 56 51	2793	108 22 14	2783

## AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S						Sidereal Time of the Semi-diameter passing the Meridian.	Equation of Time, to be added to Apparent Time.	Diff. for 1 hour.
		Apparent Right Ascension.		Diff. for 1 hour.	Apparent Declination.		Diff. for 1 hour.			
Frid.	1	<sup>h</sup> 22 <sup>m</sup> 50 <sup>s</sup> 52.11	9.347	S. 7° 20' 43.6"	57.12	16' 10.21"	65.39	<sup>m</sup> 12 <sup>s</sup> 27.01	0.508	
Sat.	2	22 54 36.19	9.328	6 57 49.3	57.38	16 9.97	65.32	12 14.57	0.527	
Sun.	3	22 58 19.81	9.309	6 34 49.1	57.62	16 9.71	65.25	12 1.67	0.546	
Mon.	4	23 2 2.97	9.291	6 11 43.3	57.85	16 9.45	65.17	11 48.32	0.564	
Tues.	5	23 5 45.71	9.273	5 48 32.3	58.06	16 9.19	65.11	11 34.55	0.581	
Wed.	6	23 9 28.05	9.255	5 25 16.5	58.25	16 8.93	65.05	11 20.37	0.599	
Thur.	7	23 13 9.99	9.239	5 1 56.3	58.42	16 8.67	64.99	11 5.80	0.615	
Frid.	8	23 16 51.55	9.224	4 38 32.1	58.58	16 8.41	64.93	10 50.85	0.630	
Sat.	9	23 20 32.75	9.209	4 15 4.3	58.72	16 8.14	64.89	10 35.53	0.645	
Sun.	10	23 24 13.60	9.195	3 51 33.2	58.85	16 7.88	64.83	10 19.88	0.659	
Mon.	11	23 27 54.13	9.182	3 27 59.4	58.96	16 7.62	64.79	10 3.90	0.672	
Tues.	12	23 31 34.35	9.169	3 4 23.1	59.05	16 7.36	64.75	9 47.61	0.685	
Wed.	13	23 35 14.28	9.156	2 40 44.8	59.15	16 7.09	64.71	9 31.02	0.698	
Thur.	14	23 38 53.92	9.145	2 17 5.0	59.19	16 6.83	64.67	9 14.16	0.709	
Frid.	15	23 42 33.30	9.135	1 53 24.0	59.24	16 6.57	64.64	8 57.03	0.719	
Sat.	16	23 46 12.44	9.126	1 29 42.1	59.26	16 6.31	64.61	8 39.66	0.728	
Sun.	17	23 49 51.36	9.117	1 5 59.7	59.27	16 6.04	64.58	8 22.07	0.737	
Mon.	18	23 53 30.08	9.109	0 42 17.1	59.26	16 5.77	64.54	8 4.30	0.745	
Tues.	19	23 57 8.62	9.102	S. 0 18 35.0	59.25	16 5.50	64.52	7 46.34	0.752	
Wed.	20	0 0 47.01	9.097	N. 0 5 6.4	59.21	16 5.23	64.50	7 28.22	0.757	
Thur.	21	0 4 25.27	9.092	0 28 47.0	59.17	16 4.96	64.49	7 9.97	0.762	
Frid.	22	0 8 3.42	9.088	0 52 26.3	59.10	16 4.69	64.48	6 51.62	0.766	
Sat.	23	0 11 41.48	9.084	1 16 3.8	59.02	16 4.41	64.47	6 33.18	0.770	
Sun.	24	0 15 19.48	9.082	1 39 39.2	58.92	16 4.14	64.46	6 14.67	0.772	
Mon.	25	0 18 57.44	9.081	2 3 12.2	58.82	16 3.86	64.46	5 56.13	0.773	
Tues.	26	0 22 35.39	9.081	2 26 42.6	58.71	16 3.58	64.46	5 37.59	0.773	
Wed.	27	0 26 13.35	9.082	2 50 10.0	58.58	16 3.30	64.47	5 19.05	0.772	
Thur.	28	0 29 51.34	9.083	3 13 34.1	58.43	16 3.02	64.47	5 0.53	0.771	
Frid.	29	0 33 29.39	9.086	3 36 54.6	58.27	16 2.73	64.48	4 42.07	0.768	
Sat.	30	0 37 7.51	9.090	4 0 11.2	58.08	16 2.45	64.49	4 23.69	0.764	
Sun.	31	0 40 45.73	9.095	4 23 23.3	57.90	16 2.16	64.50	4 5.41	0.759	
Mon.	32	0 44 24.07	9.100	N. 4 46 30.9	57.68	16 1.88	64.52	3 47.24	0.754	

NOTE.—Mean Time of the Semidiameter passing may be found by subtracting 0<sup>m</sup>.18 from the Sidereal Time.

## AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time, to be subtracted from Mean Time.	Diff. for 1 hour.	Sidereal Time or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.			
Frid.	1	<sup>h</sup> 22 <sup>m</sup> 50 <sup>s</sup> 50.16	9.348	S. 7° 20' 55.4"	57.13	<sup>m</sup> 12 <sup>s</sup> 27.11	0.508	<sup>h</sup> 22 <sup>m</sup> 38 <sup>s</sup> 23.05
Sat.	2	22 54 34.28	9.329	6 58 1.0	57.39	12 14.67	0.527	22 42 19.61
Sun.	3	22 58 17.94	9.310	6 35 0.7	57.63	12 1.78	0.546	22 46 16.16
Mon.	4	23 2 1.14	9.292	6 11 54.7	57.86	11 48.43	0.564	22 50 12.71
Tues.	5	23 5 43.92	9.274	5 48 43.5	58.07	11 34.65	0.581	22 54 9.27
Wed.	6	23 9 26.30	9.257	5 25 27.5	58.26	11 20.48	0.599	22 58 5.82
Thur.	7	23 13 8.28	9.241	5 2 7.1	58.43	11 5.91	0.615	23 2 2.37
Frid.	8	23 16 49.89	9.226	4 38 42.7	58.59	10 50.97	0.630	23 5 58.92
Sat.	9	23 20 31.12	9.211	4 15 14.7	58.73	10 35.64	0.645	23 9 55.48
Sun.	10	23 24 12.02	9.197	3 51 43.4	58.86	10 19.99	0.659	23 13 52.03
Mon.	11	23 27 52.59	9.184	3 28 9.3	58.97	10 4.01	0.672	23 17 48.58
Tues.	12	23 31 32.85	9.171	3 4 32.7	59.06	9 47.71	0.685	23 21 45.14
Wed.	13	23 35 12.82	9.158	2 40 54.2	59.14	9 31.13	0.698	23 25 41.69
Thur.	14	23 38 52.51	9.147	2 17 14.1	59.20	9 14.26	0.709	23 29 38.25
Frid.	15	23 42 31.93	9.137	1 53 32.8	59.25	8 57.14	0.719	23 33 34.79
Sat.	16	23 46 11.12	9.128	1 29 50.6	59.27	8 39.77	0.728	23 37 31.35
Sun.	17	23 49 50.08	9.119	1 6 8.0	59.28	8 22.17	0.737	23 41 27.91
Mon.	18	23 53 28.85	9.111	0 42 25.1	59.27	8 4.39	0.745	23 45 24.46
Tues.	19	23 57 7.44	9.104	S. 0 18 42.7	59.26	7 46.43	0.752	23 49 21.01
Wed.	20	0 0 45.87	9.099	N. 0 4 59.1	59.22	7 38.31	0.757	23 53 17.56
Thur.	21	0 4 24.18	9.096	0 28 40.0	59.18	7 10.06	0.762	23 57 14.12
Frid.	22	0 8 2.38	9.090	0 52 19.6	59.11	6 51.71	0.766	0 1 10.67
Sat.	23	0 11 40.49	9.086	1 15 57.3	59.03	6 33.27	0.770	0 5 7.22
Sun.	24	0 15 18.53	9.084	1 39 33.1	58.93	6 14.75	0.772	0 9 3.78
Mon.	25	0 18 56.54	9.083	2 3 6.4	58.83	5 56.21	0.773	0 13 0.33
Tues.	26	0 22 34.54	9.083	2 26 37.1	58.72	5 37.66	0.773	0 16 56.88
Wed.	27	0 26 12.55	9.084	2 50 4.8	58.59	5 19.12	0.772	0 20 53.43
Thur.	28	0 29 50.59	9.085	3 13 29.2	58.44	5 0.61	0.771	0 24 49.98
Frid.	29	0 33 28.67	9.088	3 36 50.0	58.28	4 42.13	0.768	0 28 46.54
Sat.	30	0 37 6.84	9.092	4 0 6.9	58.10	4 23.75	0.764	0 32 43.09
Sun.	31	0 40 45.11	9.097	4 23 19.4	57.91	4 5.47	0.759	0 36 39.64
Mon.	32	0 44 23.49	9.102	N. 4 46 27.3	57.69	3 47.29	0.754	0 40 36.20

NOTE.—The Semidiameter for Mean Noon may be assumed the same as that for Apparent Noon.

Diff. for 1 hour  
+9<sup>s</sup>.8565

AT GREENWICH MEAN NOON.									
Day of the Month.	Day of the Year.	THE SUN'S					Logarithm of the Radius Vector of the Earth.	Diff. for 1 hour.	Mean Time of Sidereal Oh.
		True LONGITUDE.		Diff. for 1 hour.	LATITUDE.				
		$\lambda$	$\lambda'$						
1	61	341° 15' 42.5	15° 50.3	150.35	+0.22	9.9963084	+47.0	<sup>h</sup> 1 <sup>m</sup> 21 <sup>s</sup> 23.57	
2	62	342 15 50.0	15 57.7	150.28	+0.08	.9964219	47.4	1 17 27.66	
3	63	343 15 56.0	16 3.6	150.22	-0.06	.9965364	47.8	1 13 31.75	
4	64	344 16 0.4	16 7.9	150.15	0.20	.9966517	48.1	1 9 35.85	
5	65	345 16 3.2	16 10.6	150.08	0.31	.9967678	48.4	1 5 39.94	
6	66	346 16 4.4	16 11.7	150.01	0.41	.9968845	48.6	1 1 44.03	
7	67	347 16 3.9	16 11.1	149.94	0.49	.9970016	48.8	0 57 48.12	
8	68	348 16 1.6	16 8.7	149.87	0.55	.9971190	48.9	0 53 52.21	
9	69	349 15 57.4	16 4.4	149.79	0.57	.9972366	49.0	0 49 56.31	
10	70	350 15 51.3	15 58.1	149.71	0.56	.9973544	49.1	0 46 0.41	
11	71	351 15 43.2	15 50.0	149.62	0.52	.9974722	49.1	0 42 4.50	
12	72	352 15 33.0	15 39.7	149.53	0.45	.9975901	49.2	0 38 8.59	
13	73	353 15 20.6	15 27.2	149.44	0.36	.9977083	49.3	0 34 12.68	
14	74	354 15 5.9	15 12.4	149.35	0.26	.9978267	49.4	0 30 16.77	
15	75	355 14 49.0	14 55.4	149.25	0.14	.9979453	49.5	0 26 20.86	
16	76	356 14 29.8	14 36.1	149.16	-0.01	.9980643	49.6	0 22 24.96	
17	77	357 14 8.5	14 14.7	149.06	+0.12	.9981837	49.8	0 18 29.05	
18	78	358 13 44.9	13 51.0	148.97	0.25	.9983036	50.0	0 14 33.14	
19	79	359 13 18.9	13 24.9	148.87	0.35	.9984240	50.3	0 10 37.23	
20	80	0 12 50.6	12 56.5	148.78	0.43	.9985450	50.6	0 6 41.32	
21	81	1 12 20.0	12 25.8	148.68	0.50	.9986669	51.0	{ 0 2 45.42 23 58 49.51	
22	82	2 11 47.2	11 52.9	148.59	0.54	.9987899	51.3	23 54 53.60	
23	83	3 11 12.3	11 17.9	148.50	0.55	.9989132	51.6	23 50 57.69	
24	84	4 10 35.3	10 40.8	148.41	0.52	.9990376	51.9	23 47 1.79	
25	85	5 9 56.3	10 1.7	148.33	0.46	.9991628	52.3	23 43 5.88	
26	86	6 9 15.3	9 20.6	148.25	0.37	.9992887	52.6	23 39 9.97	
27	87	7 8 32.3	8 37.5	148.17	0.27	.9994152	52.9	23 35 14.07	
28	88	8 7 47.4	7 52.5	148.09	0.14	.9995424	53.1	23 31 18.17	
29	89	9 7 0.7	7 5.7	148.02	+0.01	.9996702	53.3	23 27 22.26	
30	90	10 6 12.2	6 17.1	147.94	-0.13	.9997983	53.4	23 23 26.35	
31	91	11 5 21.9	5 26.7	147.87	0.26	9.9999266	53.5	23 19 30.44	
32	92	12 4 29.8	4 34.4	147.79	-0.37	0.0000549	+53.4	23 15 34.54	
NOTE: $\lambda$ corresponds to the true equinox of the date, $\lambda'$ to the mean equinox of January 0d.								Diff. for 1 hour -9°.8296	

## GREENWICH MEAN TIME.

Day of the Month.	THE MOON'S									
	SEMI-DIAMETER.		HORIZONTAL PARALLAX.				MERIDIAN PASSAGE.		AGE.	
	Noon.	Midnight.	Noon.	Diff. for 1 hour.	Midnight.	Diff. for 1 hour.		Diff. for 1 hour.	Noon.	
1	15 55.2	15 59.1	58 18.9	+1.21	58 33.3	+1.19	<sup>b</sup> 17 <sup>m</sup> 29.7	<sup>m</sup> 2.29	<sup>d</sup> 21.4	
2	16 2.9	16 6.6	58 47.4	1.15	59 0.9	1.10	18 26.6	2.45	22.4	
3	16 10.1	16 13.3	59 13.7	1.02	59 25.4	0.93	19 26.9	2.56	23.4	
4	16 16.1	16 18.5	59 35.8	0.80	59 44.6	0.65	20 28.9	2.58	24.4	
5	16 20.4	16 21.6	59 51.4	0.47	59 55.9	+0.27	21 30.4	2.52	25.4	
6	16 22.1	16 21.9	59 57.9	+0.05	59 57.0	-0.19	22 29.6	2.39	26.4	
7	16 20.8	16 18.9	59 53.1	-0.45	59 46.2	0.71	23 25.2	2.24	27.4	
8	16 16.2	16 12.7	59 36.2	0.96	59 23.3	1.19	<sup>δ</sup> 0 17.3	2.10	28.4	
9	16 8.4	16 3.5	59 7.7	1.41	58 49.6	1.59	0 17.3	2.10	29.4	
10	15 58.1	15 52.2	58 29.6	1.75	58 7.9	1.86	1 6.4	2.00	1.0	
11	15 45.9	15 39.6	57 45.0	1.94	57 21.6	1.97	1 53.6	1.94	2.0	
12	15 33.1	15 26.8	56 57.9	1.96	56 34.6	1.92	2 39.8	1.92	3.0	
13	15 20.6	15 14.8	56 12.1	1.83	55 50.7	1.72	3 25.9	1.93	4.0	
14	15 9.4	15 4.5	55 30.9	1.58	55 12.9	1.41	4 12.6	1.97	5.0	
15	15 0.2	14 56.5	54 57.0	1.23	54 43.4	1.04	5 0.3	2.01	6.0	
16	14 53.4	14 51.1	54 32.2	0.83	54 23.5	0.62	5 49.1	2.05	7.0	
17	14 49.4	14 48.5	54 17.4	-0.40	54 14.0	-0.18	6 38.8	2.08	8.0	
18	14 48.2	14 48.7	54 13.1	+0.04	54 14.8	+0.25	7 28.7	2.08	9.0	
19	14 49.8	14 51.6	54 19.0	0.45	54 25.5	0.64	8 18.3	2.05	10.0	
20	14 54.0	14 56.9	54 34.2	0.81	54 44.9	0.97	9 7.0	2.00	11.0	
21	15 0.3	15 4.1	54 57.3	1.11	55 11.3	1.22	9 54.4	1.95	12.0	
22	15 8.3	15 12.7	55 26.6	1.32	55 42.9	1.39	10 40.5	1.90	13.0	
23	15 17.3	15 22.0	55 59.8	1.43	56 17.2	1.46	11 25.8	1.88	14.0	
24	15 26.8	15 31.5	56 34.7	1.46	56 52.1	1.43	12 10.7	1.88	15.0	
25	15 36.1	15 40.6	57 9.0	1.39	57 25.3	1.33	12 56.3	1.93	16.0	
26	15 44.8	15 48.7	57 40.8	1.25	57 55.3	1.16	13 43.4	2.01	17.0	
27	15 52.4	15 55.7	58 8.7	1.07	58 20.9	0.96	14 32.9	2.13	18.0	
28	15 58.7	16 1.3	58 31.8	0.86	58 41.5	0.76	15 25.6	2.27	19.0	
29	16 3.6	16 5.6	58 50.0	0.65	58 57.3	0.55	16 21.8	2.41	20.0	
30	16 7.3	16 8.6	59 3.3	0.46	59 8.2	0.36	17 21.1	2.52	21.0	
31	16 9.6	16 10.3	59 12.1	0.27	59 14.7	+0.17	18 22.0	2.54	22.0	
32	16 10.8	16 10.8	59 16.2	+0.08	59 16.5	-0.03	19 22.6	2.48	23.0	



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
FRIDAY 1.					SUNDAY 3.				
0	15 <sup>h</sup> 30 <sup>m</sup> 22.89	2.9648	S. 16° 58' 22.7"	10.957	0	17 <sup>h</sup> 25 <sup>m</sup> 59.92	2.5449	S. 23° 38' 6.1"	5.164
1	15 32 38.95	2.9707	17 9 17.5	10.968	1	17 28 32.76	2.5498	23 43 11.3	5.010
2	15 34 55.37	2.9767	17 20 6.9	10.779	2	17 31 5.89	2.5545	23 48 7.2	4.855
3	15 37 12.15	2.9827	17 30 51.0	10.689	3	17 33 39.30	2.5592	23 52 53.9	4.700
4	15 39 29.29	2.9886	17 41 29.6	10.597	4	17 36 12.99	2.5637	23 57 31.2	4.543
5	15 41 46.78	2.9945	17 52 2.7	10.506	5	17 38 46.94	2.5682	24 1 59.0	4.385
6	15 44 4.63	2.3005	18 2 30.3	10.413	6	17 41 21.16	2.5725	24 6 17.4	4.227
7	15 46 22.84	2.3065	18 12 52.2	10.318	7	17 43 55.64	2.5768	24 10 26.2	4.067
8	15 48 41.42	2.3126	18 23 8.2	10.217	8	17 46 30.37	2.5810	24 14 25.5	3.908
9	15 51 0.36	2.3187	18 33 18.2	10.117	9	17 49 5.35	2.5850	24 18 15.1	3.745
10	15 53 19.67	2.3248	18 43 22.3	10.018	10	17 51 40.57	2.5890	24 21 54.9	3.582
11	15 55 39.34	2.3309	18 53 20.4	9.917	11	17 54 16.03	2.5929	24 25 25.0	3.420
12	15 57 59.38	2.3370	19 3 12.3	9.814	12	17 56 51.72	2.5967	24 28 45.2	3.255
13	16 0 19.79	2.3431	19 12 58.0	9.710	13	17 59 27.63	2.6003	24 31 55.5	3.090
14	16 2 40.56	2.3492	19 22 37.4	9.604	14	18 2 3.75	2.6038	24 34 55.9	2.924
15	16 5 1.70	2.3553	19 32 10.4	9.496	15	18 4 40.08	2.6072	24 37 46.3	2.757
16	16 7 23.22	2.3615	19 41 36.9	9.387	16	18 7 16.61	2.6105	24 40 26.7	2.591
17	16 9 45.10	2.3677	19 50 56.8	9.276	17	18 9 53.33	2.6137	24 42 57.0	2.421
18	16 12 7.34	2.3738	20 0 10.0	9.164	18	18 12 30.23	2.6167	24 45 17.2	2.252
19	16 14 29.96	2.3800	20 9 16.5	9.050	19	18 15 7.31	2.6195	24 47 27.2	2.082
20	16 16 52.94	2.3861	20 18 16.1	8.935	20	18 17 44.56	2.6223	24 49 27.0	1.912
21	16 19 16.29	2.3922	20 27 8.8	8.820	21	18 20 21.98	2.6250	24 51 16.7	1.743
22	16 21 40.01	2.3983	20 35 54.5	8.702	22	18 22 59.56	2.6275	24 52 56.1	1.570
23	16 24 4.09	2.4044	S. 20 44 33.1	8.583	23	18 25 37.28	2.6299	S. 24 54 25.1	1.396
SATURDAY 2.					MONDAY 4.				
0	16 26 28.54	2.4105	S. 20 53 4.5	8.463	0	18 28 15.14	2.6321	S. 24 55 43.7	1.224
1	16 28 53.35	2.4165	21 1 28.6	8.341	1	18 30 53.13	2.6342	24 56 52.0	1.052
2	16 31 18.52	2.4226	21 9 45.4	8.219	2	18 33 31.24	2.6362	24 57 49.9	0.878
3	16 33 44.06	2.4287	21 17 54.8	8.094	3	18 36 9.47	2.6381	24 58 37.3	0.704
4	16 36 9.96	2.4347	21 25 56.6	7.966	4	18 38 47.81	2.6398	24 59 14.3	0.530
5	16 38 36.22	2.4407	21 33 50.8	7.839	5	18 41 26.24	2.6413	24 59 40.8	0.355
6	16 41 2.83	2.4467	21 41 37.3	7.710	6	18 44 4.77	2.6428	24 59 56.8	0.180
7	16 43 29.80	2.4525	21 49 16.0	7.580	7	18 46 43.38	2.6441	25 0 2.3	-0.005
8	16 45 57.12	2.4583	21 56 46.9	7.448	8	18 49 22.06	2.6452	24 59 57.3	+0.171
9	16 48 24.79	2.4642	22 4 9.8	7.315	9	18 52 0.80	2.6462	24 59 41.7	0.347
10	16 50 52.81	2.4700	22 11 24.6	7.180	10	18 54 39.60	2.6471	24 59 15.6	0.522
11	16 53 21.18	2.4757	22 18 31.4	7.045	11	18 57 18.45	2.6478	24 58 39.0	0.699
12	16 55 49.89	2.4813	22 25 30.0	6.909	12	18 59 57.34	2.6484	24 57 51.8	0.875
13	16 58 18.94	2.4870	22 32 20.4	6.770	13	19 2 36.26	2.6488	24 56 54.0	1.051
14	17 0 48.32	2.4927	22 39 2.4	6.629	14	19 5 15.20	2.6491	24 55 45.6	1.226
15	17 3 18.04	2.4982	22 45 35.9	6.487	15	19 7 54.15	2.6492	24 54 26.6	1.405
16	17 5 48.09	2.5037	22 52 0.9	6.346	16	19 10 33.10	2.6492	24 52 57.0	1.580
17	17 8 18.47	2.5090	22 58 17.4	6.203	17	19 13 12.05	2.6491	24 51 16.9	1.752
18	17 10 49.17	2.5143	23 4 25.2	6.058	18	19 15 50.99	2.6489	24 49 26.3	1.931
19	17 13 20.19	2.5196	23 10 24.3	5.911	19	19 18 29.91	2.6484	24 47 25.1	2.106
20	17 15 51.52	2.5248	23 16 14.5	5.763	20	19 21 8.79	2.6478	24 45 13.3	2.285
21	17 18 23.17	2.5300	23 21 55.9	5.615	21	19 23 47.64	2.6471	24 42 50.9	2.460
22	17 20 55.12	2.5350	23 27 28.3	5.465	22	19 26 26.44	2.6462	24 40 18.0	2.635
23	17 23 27.37	2.5400	23 32 51.7	5.315	23	19 29 5.18	2.6452	24 37 34.7	2.809
24	17 25 59.92	2.5449	S. 23 38 6.1	5.164	24	19 31 43.86	2.6440	S. 24 34 40.9	2.984

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
TUESDAY 5.					THURSDAY 7.				
0	19 31 43.86	2.6440	S. 24° 34' 40.9"	2.984	0	21 35 3.04	2.4590	S. 19° 5' 4.3"	10.319
1	19 34 22.46	2.6497	24 31 36.6	3.158	1	21 37 30.41	2.4532	18 54 42.0	10.432
2	19 37 0.98	2.6413	24 28 21.9	3.332	2	21 39 57.44	2.4477	18 44 12.5	10.550
3	19 39 39.42	2.6398	24 24 56.7	3.506	3	21 42 24.13	2.4420	18 33 36.0	10.666
4	19 42 17.76	2.6381	24 21 21.1	3.679	4	21 44 50.48	2.4363	18 22 52.6	10.781
5	19 44 55.99	2.6363	24 17 35.2	3.850	5	21 47 16.49	2.4307	18 12 2.3	10.894
6	19 47 34.11	2.6343	24 13 39.1	4.021	6	21 49 42.16	2.4250	18 1 5.3	11.006
7	19 50 12.11	2.6322	24 9 32.7	4.193	7	21 52 7.49	2.4193	17 50 1.6	11.116
8	19 52 49.97	2.6300	24 5 15.9	4.365	8	21 54 32.48	2.4137	17 38 51.4	11.224
9	19 55 27.70	2.6277	24 0 48.9	4.535	9	21 56 57.12	2.4080	17 27 34.7	11.331
10	19 58 5.28	2.6252	23 56 11.7	4.703	10	21 59 21.42	2.4022	17 16 11.8	11.436
11	20 0 42.71	2.6225	23 51 24.5	4.871	11	22 1 45.37	2.3964	17 4 42.6	11.539
12	20 3 19.98	2.6198	23 46 27.2	5.038	12	22 4 8.98	2.3906	16 53 7.2	11.640
13	20 5 57.08	2.6170	23 41 19.9	5.205	13	22 6 32.24	2.3848	16 41 25.7	11.739
14	20 8 34.00	2.6140	23 36 2.6	5.371	14	22 8 55.16	2.3791	16 29 38.4	11.837
15	20 11 10.75	2.6109	23 30 35.3	5.537	15	22 11 17.74	2.3734	16 17 45.5	11.933
16	20 13 47.31	2.6077	23 24 58.1	5.701	16	22 13 39.97	2.3676	16 5 46.8	12.027
17	20 16 23.67	2.6043	23 19 11.2	5.863	17	22 16 1.86	2.3618	15 53 42.4	12.120
18	20 18 59.82	2.6008	23 13 14.5	6.026	18	22 18 23.40	2.3561	15 41 32.4	12.212
19	20 21 35.77	2.5973	23 7 8.1	6.187	19	22 20 44.60	2.3505	15 29 17.0	12.300
20	20 24 11.50	2.5937	23 0 52.1	6.347	20	22 23 5.46	2.3448	15 16 56.4	12.386
21	20 26 47.01	2.5900	22 54 26.4	6.507	21	22 25 25.98	2.3392	15 4 30.7	12.471
22	20 29 22.29	2.5862	22 47 51.2	6.665	22	22 27 46.16	2.3335	14 51 59.9	12.555
23	20 31 57.34	2.5822	S. 22° 41' 6.6"	6.820	23	22 30 6.00	2.3278	S. 14° 39' 24.1"	12.638
WEDNESDAY 6.					FRIDAY 8.				
0	20 34 32.15	2.5789	S. 22° 34' 12.7"	6.976	0	22 32 25.50	2.3222	S. 14° 26' 43.4"	12.718
1	20 37 6.71	2.5740	22 27 9.4	7.130	1	22 34 44.67	2.3167	14 13 58.0	12.796
2	20 39 41.02	2.5696	22 19 56.9	7.284	2	22 37 3.50	2.3111	14 1 7.9	12.874
3	20 42 15.08	2.5655	22 12 35.1	7.438	3	22 39 22.00	2.3055	13 48 13.2	12.949
4	20 44 48.88	2.5610	22 5 4.2	7.590	4	22 41 40.17	2.3000	13 35 14.1	13.021
5	20 47 22.10	2.5565	21 57 24.4	7.739	5	22 43 58.01	2.2945	13 22 10.7	13.092
6	20 49 55.65	2.5520	21 49 35.6	7.887	6	22 46 15.52	2.2891	13 9 3.1	13.161
7	20 52 28.63	2.5473	21 41 38.0	8.034	7	22 48 32.71	2.2837	12 55 51.4	13.229
8	20 55 1.32	2.5425	21 33 31.5	8.180	8	22 50 49.57	2.2783	12 42 35.6	13.297
9	20 57 33.73	2.5377	21 25 16.3	8.325	9	22 53 6.11	2.2730	12 29 15.8	13.362
10	21 0 5.85	2.5329	21 16 52.5	8.467	10	22 55 22.33	2.2677	12 15 52.2	13.424
11	21 2 37.67	2.5280	21 8 20.3	8.607	11	22 57 38.24	2.2624	12 2 24.9	13.484
12	21 5 9.20	2.5230	20 59 39.6	8.748	12	22 59 53.83	2.2572	11 48 54.1	13.542
13	21 7 40.42	2.5180	20 50 50.5	8.887	13	23 2 9.11	2.2520	11 35 19.8	13.601
14	21 10 11.34	2.5128	20 41 53.1	9.024	14	23 4 24.08	2.2468	11 21 42.0	13.658
15	21 12 41.96	2.5076	20 32 47.5	9.160	15	23 6 38.74	2.2417	11 8 0.9	13.719
16	21 15 12.25	2.5023	20 23 33.8	9.294	16	23 8 53.09	2.2367	10 54 16.6	13.784
17	21 17 42.23	2.4970	20 14 12.2	9.426	17	23 11 7.15	2.2318	10 40 29.2	13.814
18	21 20 11.89	2.4917	20 4 42.7	9.558	18	23 13 20.91	2.2268	10 26 38.9	13.869
19	21 22 41.23	2.4863	19 55 5.3	9.688	19	23 15 34.37	2.2218	10 12 45.8	13.909
20	21 25 10.25	2.4809	19 45 20.2	9.816	20	23 17 47.54	2.2169	9 58 49.8	13.957
21	21 27 38.94	2.4755	19 35 27.4	9.943	21	23 20 0.42	2.2122	9 44 50.9	14.003
22	21 30 7.31	2.4700	19 25 27.1	10.067	22	23 22 13.01	2.2074	9 30 49.4	14.044
23	21 32 35.34	2.4645	19 15 19.4	10.190	23	23 24 25.32	2.2027	9 16 45.6	14.089
24	21 35 3.04	2.4590	S. 19° 5' 4.3"	10.319	24	23 26 37.34	2.1980	S. 9° 2' 39.5"	14.131

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SATURDAY 9.					MONDAY 11.				
0	<sup>h</sup> 23 <sup>m</sup> 26 <sup>s</sup> 37.34	2.1980	S. 9° 2' 39.5"	14.181	0	<sup>h</sup> 1 <sup>m</sup> 7 <sup>s</sup> 53.11	2.0459	N. 2° 31' 25.6"	14.963
1	23 28 49.09	2.1934	8 48 31.1	14.159	1	1 9 55.77	2.0435	2 45 40.5	14.232
2	23 31 0.56	2.1888	8 34 20.4	14.186	2	1 11 58.33	2.0418	2 59 53.5	14.302
3	23 33 11.76	2.1843	8 20 7.5	14.231	3	1 14 0.80	2.0403	3 14 4.7	14.171
4	23 35 22.69	2.1799	8 5 52.7	14.264	4	1 16 3.18	2.0388	3 28 14.0	14.139
5	23 37 33.36	2.1756	7 51 35.9	14.295	5	1 18 5.47	2.0375	3 42 21.4	14.106
6	23 39 43.77	2.1713	7 37 17.3	14.324	6	1 20 7.68	2.0362	3 56 26.7	14.071
7	23 41 53.92	2.1670	7 22 57.0	14.352	7	1 22 9.81	2.0349	4 10 29.9	14.035
8	23 44 3.82	2.1628	7 8 35.1	14.377	8	1 24 11.87	2.0337	4 24 30.9	13.999
9	23 46 13.46	2.1586	6 54 11.7	14.402	9	1 26 13.86	2.0325	4 38 29.7	13.961
10	23 48 22.86	2.1545	6 39 46.9	14.425	10	1 28 15.78	2.0313	4 52 26.2	13.922
11	23 50 32.01	2.1505	6 25 20.7	14.448	11	1 30 17.63	2.0303	5 6 20.3	13.883
12	23 52 40.92	2.1465	6 10 53.1	14.469	12	1 32 19.42	2.0293	5 20 12.1	13.843
13	23 54 49.60	2.1425	5 56 24.4	14.487	13	1 34 21.16	2.0283	5 34 1.4	13.800
14	23 56 58.04	2.1386	5 41 54.7	14.502	14	1 36 22.84	2.0275	5 47 48.1	13.756
15	23 59 6.25	2.1348	5 27 24.1	14.517	15	1 38 24.47	2.0267	6 1 32.1	13.712
16	0 1 14.24	2.1311	5 12 52.6	14.532	16	1 40 26.05	2.0260	6 15 13.5	13.667
17	0 3 22.00	2.1275	4 58 20.2	14.546	17	1 42 27.59	2.0253	6 28 52.2	13.621
18	0 5 29.54	2.1239	4 43 47.0	14.557	18	1 44 29.09	2.0247	6 42 28.1	13.575
19	0 7 36.87	2.1203	4 29 13.3	14.568	19	1 46 30.56	2.0241	6 56 1.2	13.528
20	0 9 43.99	2.1168	4 14 39.1	14.575	20	1 48 31.99	2.0235	7 9 31.4	13.478
21	0 11 50.90	2.1134	4 0 4.3	14.583	21	1 50 33.39	2.0230	7 22 58.6	13.428
22	0 13 57.61	2.1100	3 45 29.1	14.589	22	1 52 34.76	2.0226	7 36 22.8	13.378
23	0 16 4.12	2.1067	S. 3 30 53.7	14.591	23	1 54 36.11	2.0223	N. 7 49 43.9	13.326
SUNDAY 10.					TUESDAY 12.				
0	0 18 10.43	2.1035	S. 3 16 18.2	14.593	0	1 56 37.44	2.0220	N. 8 3 1.9	13.274
1	0 20 16.55	2.1003	3 1 42.6	14.594	1	1 58 38.75	2.0217	8 16 16.7	13.220
2	0 22 22.48	2.0979	2 47 6.9	14.595	2	2 0 40.05	2.0215	8 29 28.2	13.165
3	0 24 28.23	2.0949	2 32 31.2	14.594	3	2 2 41.34	2.0213	8 42 36.5	13.110
4	0 26 33.79	2.0919	2 17 55.7	14.590	4	2 4 42.62	2.0213	8 55 41.4	13.054
5	0 28 39.18	2.0883	2 3 20.4	14.585	5	2 6 43.90	2.0213	9 8 42.9	12.998
6	0 30 44.40	2.0855	1 48 45.3	14.581	6	2 8 45.18	2.0213	9 21 41.1	12.941
7	0 32 49.45	2.0827	1 34 10.6	14.573	7	2 10 46.46	2.0213	9 34 35.8	12.881
8	0 34 54.33	2.0800	1 19 36.5	14.564	8	2 12 47.74	2.0213	9 47 26.8	12.819
9	0 36 59.05	2.0773	1 5 2.9	14.555	9	2 14 49.03	2.0215	10 0 14.1	12.758
10	0 39 3.62	2.0748	0 50 29.9	14.544	10	2 16 50.33	2.0217	10 12 57.8	12.698
11	0 41 8.03	2.0723	0 35 57.6	14.533	11	2 18 51.65	2.0220	10 25 37.8	12.637
12	0 43 12.29	2.0698	0 21 26.0	14.520	12	2 20 52.98	2.0223	10 38 14.2	12.575
13	0 45 16.41	2.0673	S. 0 6 55.3	14.505	13	2 22 54.33	2.0227	10 50 46.7	12.510
14	0 47 20.38	2.0650	N. 0 7 34.5	14.489	14	2 24 55.70	2.0231	11 3 15.3	12.445
15	0 49 24.21	2.0627	0 22 3.3	14.471	15	2 26 57.10	2.0235	11 15 40.0	12.378
16	0 51 27.91	2.0605	0 36 31.0	14.453	16	2 28 58.53	2.0240	11 28 0.7	12.311
17	0 53 31.48	2.0583	0 50 57.6	14.433	17	2 30 59.98	2.0245	11 40 17.4	12.245
18	0 55 34.92	2.0563	1 5 23.0	14.412	18	2 33 1.47	2.0251	11 52 30.2	12.179
19	0 57 38.24	2.0543	1 19 47.0	14.389	19	2 35 3.00	2.0257	12 4 38.9	12.110
20	0 59 41.44	2.0523	1 34 9.7	14.366	20	2 37 4.56	2.0263	12 16 43.4	12.039
21	1 1 44.52	2.0503	1 48 31.0	14.343	21	2 39 6.16	2.0270	12 28 43.6	11.968
22	1 3 47.49	2.0485	2 2 50.8	14.317	22	2 41 7.81	2.0278	12 40 39.6	11.898
23	1 5 50.35	2.0468	2 17 9.0	14.290	23	2 43 9.50	2.0285	12 52 31.4	11.827
24	1 7 53.11	2.0452	N. 2 31 25.6	14.263	24	2 45 11.24	2.0293	N. 13 4 18.8	11.755

## GREENWICH MEAN TIME

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
WEDNESDAY 13.					FRIDAY 15.				
0	2 45 11.24	2.0293	N.13° 4' 18.8"	11.755	0	4 24 7.67	2.1010	N.20° 52' 13.2"	7.509
1	2 47 13.03	2.0309	13 16 1.9	11.681	1	4 26 13.79	2.1028	20 59 40.6	7.406
2	2 49 14.87	2.0319	13 27 40.5	11.607	2	4 28 20.02	2.1046	21 7 1.9	7.303
3	2 51 16.77	2.0321	13 39 14.7	11.533	3	4 30 26.35	2.1064	21 14 17.0	7.200
4	2 53 18.72	2.0330	13 50 44.4	11.457	4	4 32 32.79	2.1082	21 21 25.9	7.096
5	2 55 20.73	2.0340	14 2 9.5	11.381	5	4 34 39.34	2.1100	21 28 28.5	6.992
6	2 57 22.81	2.0351	14 13 30.1	11.304	6	4 36 46.00	2.1118	21 35 24.9	6.888
7	2 59 24.95	2.0362	14 24 46.0	11.226	7	4 38 52.77	2.1136	21 42 15.1	6.783
8	3 1 27.16	2.0373	14 35 57.3	11.149	8	4 40 59.64	2.1154	21 48 58.9	6.677
9	3 3 29.43	2.0385	14 47 3.9	11.070	9	4 43 6.62	2.1172	21 55 36.3	6.571
10	3 5 31.77	2.0397	14 58 5.7	10.990	10	4 45 13.71	2.1190	22 2 7.4	6.465
11	3 7 34.19	2.0410	15 9 2.8	10.909	11	4 47 20.90	2.1207	22 8 32.1	6.358
12	3 9 36.68	2.0422	15 19 54.9	10.828	12	4 49 28.20	2.1225	22 14 50.3	6.250
13	3 11 39.25	2.0434	15 30 42.1	10.747	13	4 51 35.60	2.1242	22 21 2.1	6.143
14	3 13 41.89	2.0447	15 41 24.5	10.666	14	4 53 43.11	2.1260	22 27 7.4	6.036
15	3 15 44.61	2.0460	15 52 2.0	10.583	15	4 55 50.72	2.1277	22 23 6.3	5.928
16	3 17 47.41	2.0473	16 2 34.4	10.498	16	4 57 58.43	2.1293	22 38 58.7	5.818
17	3 19 50.30	2.0488	16 13 1.8	10.414	17	5 0 6.24	2.1310	22 44 44.5	5.708
18	3 21 53.28	2.0503	16 23 24.0	10.330	18	5 2 14.16	2.1327	22 50 23.7	5.599
19	3 23 56.34	2.0517	16 33 41.2	10.244	19	5 4 22.18	2.1343	22 55 56.4	5.490
20	3 25 59.49	2.0532	16 43 53.2	10.157	20	5 6 30.29	2.1359	23 1 22.5	5.379
21	3 28 2.72	2.0547	16 54 0.0	10.070	21	5 8 38.49	2.1375	23 6 41.9	5.268
22	3 30 6.04	2.0561	17 4 1.6	9.983	22	5 10 46.79	2.1391	23 11 54.7	5.158
23	3 32 9.45	2.0576	N.17 13 58.0	9.896	23	5 12 55.18	2.1407	N.23 17 0.8	5.046
THURSDAY 14.					SATURDAY 16.				
0	3 34 12.96	2.0592	N.17 23 49.1	9.807	0	5 15 3.67	2.1423	N.23 22 0.2	4.934
1	3 36 16.56	2.0606	17 33 34.8	9.717	1	5 17 12.25	2.1438	23 26 52.9	4.822
2	3 38 20.26	2.0624	17 43 15.1	9.627	2	5 19 20.92	2.1453	23 31 38.9	4.710
3	3 40 24.06	2.0640	17 52 50.0	9.537	3	5 21 29.68	2.1468	23 36 18.1	4.597
4	3 42 27.95	2.0657	18 2 19.5	9.446	4	5 23 38.53	2.1482	23 40 50.5	4.484
5	3 44 31.94	2.0673	18 11 43.5	9.354	5	5 25 47.46	2.1496	23 45 16.2	4.371
6	3 46 36.04	2.0690	18 21 2.0	9.261	6	5 27 56.48	2.1510	23 49 35.0	4.257
7	3 48 40.24	2.0706	18 30 14.9	9.168	7	5 30 5.58	2.1523	23 53 47.0	4.143
8	3 50 44.54	2.0723	18 39 22.2	9.076	8	5 32 14.76	2.1537	23 57 52.2	4.029
9	3 52 48.93	2.0740	18 48 24.0	8.982	9	5 34 24.02	2.1551	24 1 50.5	3.915
10	3 54 53.43	2.0758	18 57 20.1	8.887	10	5 36 33.36	2.1564	24 5 41.9	3.800
11	3 56 58.04	2.0776	19 6 10.4	8.792	11	5 38 42.77	2.1576	24 9 26.4	3.685
12	3 59 2.75	2.0794	19 14 55.0	8.695	12	5 40 52.26	2.1588	24 13 4.0	3.570
13	4 1 7.57	2.0812	19 23 33.9	8.600	13	5 43 1.82	2.1600	24 16 34.7	3.454
14	4 3 12.49	2.0829	19 32 7.1	8.504	14	5 45 11.45	2.1612	24 19 58.4	3.338
15	4 5 17.52	2.0847	19 40 34.4	8.406	15	5 47 21.15	2.1623	24 23 15.2	3.222
16	4 7 22.66	2.0865	19 48 55.8	8.308	16	5 49 30.91	2.1633	24 26 25.0	3.105
17	4 9 27.91	2.0882	19 57 11.4	8.210	17	5 51 40.74	2.1643	24 29 27.8	2.988
18	4 11 33.26	2.0899	20 5 21.0	8.112	18	5 53 50.63	2.1653	24 32 23.6	2.871
19	4 13 38.72	2.0917	20 13 24.7	8.012	19	5 56 0.58	2.1663	24 35 12.4	2.755
20	4 15 44.29	2.0936	20 21 22.4	7.912	20	5 58 10.58	2.1672	24 37 54.2	2.639
21	4 17 49.97	2.0955	20 29 14.2	7.812	21	6 0 20.64	2.1681	24 40 29.0	2.522
22	4 19 55.76	2.0973	20 36 59.9	7.711	22	6 2 30.75	2.1690	24 42 56.8	2.404
23	4 22 1.66	2.0991	20 44 39.5	7.610	23	6 4 40.91	2.1698	24 45 17.5	2.285
24	4 24 7.67	2.1010	N.20 52 13.2	7.508	24	6 6 51.13	2.1708	N.24 47 31.0	2.167

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SUNDAY 17.					TUESDAY 19.				
0	6 <sup>h</sup> 6 <sup>m</sup> 51.13	2.1706	N.24° 47' 31".0	2.167	0	7 <sup>h</sup> 51 <sup>m</sup> 8.82	2.1585	N.24° 14' 40".1	3.519
1	6 9 1.39	2.1713	24 49 37.5	2.049	1	7 53 18.29	2.1573	24 11 5.6	3.633
2	6 11 11.69	2.1721	24 51 36.9	1.931	2	7 55 27.69	2.1560	24 7 24.2	3.747
3	6 13 22.04	2.1728	24 53 29.2	1.813	3	7 57 37.01	2.1547	24 3 35.9	3.862
4	6 15 32.42	2.1734	24 55 14.4	1.695	4	7 59 46.25	2.1533	23 59 40.7	3.977
5	6 17 42.84	2.1740	24 56 52.5	1.577	5	8 1 55.40	2.1519	23 55 38.5	4.092
6	6 19 53.29	2.1745	24 58 23.6	1.458	6	8 4 4.47	2.1505	23 51 29.5	4.206
7	6 22 3.77	2.1750	24 59 47.5	1.339	7	8 6 13.45	2.1490	23 47 13.7	4.320
8	6 24 14.28	2.1755	25 1 4.2	1.220	8	8 8 22.34	2.1475	23 42 51.1	4.433
9	6 26 24.83	2.1760	25 2 13.9	1.101	9	8 10 31.14	2.1460	23 38 21.8	4.546
10	6 28 35.40	2.1764	25 3 16.4	0.982	10	8 12 39.85	2.1444	23 33 45.6	4.660
11	6 30 45.99	2.1767	25 4 11.7	0.863	11	8 14 48.46	2.1428	23 29 2.6	4.773
12	6 32 56.59	2.1770	25 4 59.9	0.743	12	8 16 56.98	2.1412	23 24 12.9	4.884
13	6 35 7.21	2.1772	25 5 40.9	0.624	13	8 19 5.40	2.1395	23 19 16.5	4.996
14	6 37 17.84	2.1775	25 6 14.8	0.505	14	8 21 13.72	2.1378	23 14 13.4	5.107
15	6 39 28.49	2.1777	25 6 41.5	0.385	15	8 23 21.94	2.1362	23 9 3.7	5.217
16	6 41 39.15	2.1777	25 7 1.0	0.266	16	8 25 30.06	2.1345	23 3 47.3	5.328
17	6 43 49.81	2.1777	25 7 13.4	0.148	17	8 27 38.07	2.1327	22 58 24.3	5.439
18	6 46 0.47	2.1777	25 7 18.7	+0.029	18	8 29 45.97	2.1309	22 52 54.6	5.549
19	6 48 11.13	2.1777	25 7 16.8	-0.091	19	8 31 53.76	2.1291	22 47 18.4	5.658
20	6 50 21.79	2.1777	25 7 7.7	0.212	20	8 34 1.45	2.1273	22 41 35.7	5.767
21	6 52 32.45	2.1777	25 6 51.4	0.338	21	8 36 9.03	2.1255	22 35 46.4	5.876
22	6 54 43.10	2.1775	25 6 27.9	0.451	22	8 38 16.50	2.1237	22 29 50.6	5.984
23	6 56 53.74	2.1773	N.25 5 57.3	0.569	23	8 40 23.86	2.1218	N.22 23 48.3	6.092
MONDAY 18.					WEDNESDAY 20.				
0	6 59 4.37	2.1770	N.25 5 19.6	0.688	0	8 42 31.10	2.1198	N.22 17 39.6	6.199
1	7 1 14.98	2.1767	25 4 34.7	0.806	1	8 44 38.23	2.1179	22 11 24.5	6.305
2	7 3 25.57	2.1765	25 3 42.7	0.927	2	8 46 45.24	2.1160	22 5 3.0	6.412
3	7 5 36.15	2.1762	25 2 43.5	1.047	3	8 48 52.14	2.1140	21 58 35.0	6.519
4	7 7 46.70	2.1757	25 1 37.1	1.166	4	8 50 58.92	2.1120	21 52 0.7	6.625
5	7 9 57.22	2.1752	25 0 23.6	1.285	5	8 53 5.58	2.1100	21 45 20.1	6.729
6	7 12 7.71	2.1747	24 59 2.9	1.404	6	8 55 12.11	2.1080	21 38 33.3	6.833
7	7 14 18.17	2.1742	24 57 35.1	1.522	7	8 57 18.52	2.1060	21 31 40.2	6.937
8	7 16 28.60	2.1737	24 56 0.2	1.640	8	8 59 24.82	2.1040	21 24 40.9	7.040
9	7 18 39.00	2.1730	24 54 18.3	1.759	9	9 1 31.00	2.1019	21 17 35.4	7.143
10	7 20 49.36	2.1723	24 52 29.2	1.878	10	9 3 37.05	2.0998	21 10 23.7	7.246
11	7 22 59.67	2.1715	24 50 32.9	1.997	11	9 5 42.98	2.0978	21 3 5.9	7.349
12	7 25 9.93	2.1707	24 48 29.5	2.115	12	9 7 48.79	2.0958	20 55 41.9	7.450
13	7 27 20.15	2.1700	24 46 19.1	2.233	13	9 9 54.48	2.0938	20 48 11.9	7.550
14	7 29 30.32	2.1692	24 44 1.6	2.350	14	9 12 0.04	2.0917	20 40 35.9	7.651
15	7 31 40.45	2.1683	24 41 37.1	2.468	15	9 14 5.47	2.0896	20 32 53.8	7.752
16	7 33 50.52	2.1673	24 39 5.5	2.586	16	9 16 10.78	2.0875	20 25 5.7	7.851
17	7 36 0.53	2.1663	24 36 26.8	2.704	17	9 18 15.96	2.0854	20 17 11.7	7.949
18	7 38 10.48	2.1653	24 33 41.1	2.821	18	9 20 21.02	2.0833	20 9 11.8	8.048
19	7 40 20.37	2.1643	24 30 48.4	2.938	19	9 22 25.95	2.0812	20 1 6.0	8.145
20	7 42 30.20	2.1633	24 27 48.7	3.054	20	9 24 30.76	2.0791	19 52 54.4	8.241
21	7 44 39.96	2.1622	24 24 42.1	3.170	21	9 26 35.44	2.0770	19 44 37.0	8.338
22	7 46 49.65	2.1610	24 21 28.5	3.286	22	9 28 40.00	2.0750	19 36 13.8	8.435
23	7 48 59.27	2.1598	24 18 7.8	3.403	23	9 30 44.43	2.0729	19 27 44.9	8.530
24	7 51 8.82	2.1585	N.24 14 40.1	3.519	24	9 32 48.73	2.0707	N.19 19 10.2	8.625

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
THURSDAY 21.					SATURDAY 23.				
0	9 32 48.73	2.0707	N.19 19' 10.2"	8.825	0	11 10 3.95	1.9908	N.10 48' 40.7"	12.363
1	9 34 52.90	2.0696	19 10 29.9	8.719	1	11 12 3.37	1.9899	10 36 17.1	12.423
2	9 36 56.95	2.0685	19 1 44.0	8.813	2	11 14 2.74	1.9890	10 23 49.9	12.483
3	9 39 0.89	2.0645	18 52 52.4	8.906	3	11 16 2.05	1.9882	10 11 19.2	12.540
4	9 41 4.70	2.0634	18 43 55.3	8.998	4	11 18 1.31	1.9874	9 58 45.1	12.596
5	9 43 8.38	2.0603	18 34 52.7	9.090	5	11 20 0.53	1.9867	9 46 7.7	12.650
6	9 45 11.94	2.0583	18 25 44.5	9.182	6	11 21 59.71	1.9860	9 33 27.1	12.704
7	9 47 15.38	2.0569	18 16 30.9	9.271	7	11 23 58.85	1.9852	9 20 43.2	12.759
8	9 49 18.69	2.0542	18 7 12.0	9.360	8	11 25 57.94	1.9845	9 7 56.0	12.813
9	9 51 21.88	2.0522	17 57 47.7	9.449	9	11 27 57.00	1.9840	8 55 5.7	12.864
10	9 53 24.95	2.0502	17 48 18.1	9.538	10	11 29 56.03	1.9835	8 42 12.3	12.915
11	9 55 27.90	2.0482	17 38 43.2	9.627	11	11 31 55.03	1.9830	8 29 15.9	12.965
12	9 57 30.73	2.0462	17 29 2.9	9.715	12	11 33 54.00	1.9825	8 16 16.5	13.014
13	9 59 33.44	2.0442	17 19 17.4	9.801	13	11 35 52.94	1.9821	8 3 14.2	13.062
14	10 1 36.03	2.0422	17 9 26.8	9.886	14	11 37 51.86	1.9818	7 50 9.0	13.110
15	10 3 38.51	2.0403	16 59 31.2	9.970	15	11 39 50.76	1.9815	7 37 1.0	13.156
16	10 5 40.87	2.0384	16 49 30.5	10.055	16	11 41 49.65	1.9813	7 23 50.3	13.201
17	10 7 43.12	2.0365	16 39 24.7	10.140	17	11 43 48.53	1.9811	7 10 36.8	13.247
18	10 9 45.26	2.0346	16 29 13.8	10.223	18	11 45 47.40	1.9810	6 57 20.7	13.290
19	10 11 47.28	2.0327	16 18 58.0	10.304	19	11 47 46.26	1.9808	6 44 2.0	13.333
20	10 13 49.19	2.0308	16 8 37.3	10.386	20	11 49 45.11	1.9808	6 30 40.8	13.374
21	10 15 50.99	2.0290	15 58 11.6	10.468	21	11 51 43.96	1.9809	6 17 17.1	13.415
22	10 17 52.68	2.0273	15 47 41.1	10.548	22	11 53 42.81	1.9809	6 3 51.0	13.453
23	10 19 54.27	2.0255	N.15 37 5.9	10.626	23	11 55 41.67	1.9811	N. 5 50 22.6	13.492
FRIDAY 22.					SUNDAY 24.				
0	10 21 55.75	2.0236	N.15 26 26.0	10.704	0	11 57 40.55	1.9813	N. 5 36 51.9	13.531
1	10 23 57.13	2.0220	15 15 41.4	10.782	1	11 59 39.44	1.9815	5 23 18.9	13.568
2	10 25 58.40	2.0203	15 4 52.1	10.861	2	12 1 38.33	1.9817	5 9 43.8	13.604
3	10 27 59.57	2.0187	14 53 58.1	10.938	3	12 3 37.24	1.9820	4 56 6.5	13.640
4	10 30 0.64	2.0170	14 42 59.6	11.014	4	12 5 36.18	1.9824	4 42 27.1	13.673
5	10 32 1.61	2.0153	14 31 56.6	11.088	5	12 7 35.14	1.9828	4 28 45.8	13.704
6	10 34 2.49	2.0136	14 20 49.0	11.163	6	12 9 34.13	1.9833	4 15 2.6	13.736
7	10 36 3.27	2.0122	14 9 37.0	11.236	7	12 11 33.15	1.9838	4 1 17.5	13.768
8	10 38 3.96	2.0107	13 58 20.7	11.308	8	12 13 32.20	1.9844	3 47 30.5	13.798
9	10 40 4.56	2.0092	13 47 0.0	11.381	9	12 15 31.29	1.9851	3 33 41.8	13.826
10	10 42 5.07	2.0077	13 35 35.0	11.452	10	12 17 30.42	1.9858	3 19 51.4	13.854
11	10 44 5.49	2.0062	13 24 5.8	11.523	11	12 19 29.60	1.9867	3 5 59.4	13.880
12	10 46 5.82	2.0046	13 12 32.3	11.593	12	12 21 28.83	1.9875	2 52 5.9	13.905
13	10 48 6.07	2.0035	13 0 54.7	11.661	13	12 23 28.11	1.9884	2 38 10.9	13.930
14	10 50 6.24	2.0022	12 49 13.0	11.729	14	12 25 27.44	1.9893	2 24 14.4	13.955
15	10 52 6.34	2.0009	12 37 27.2	11.797	15	12 27 26.83	1.9903	2 10 16.4	13.978
16	10 54 6.36	1.9997	12 25 37.4	11.863	16	12 29 26.28	1.9913	1 56 17.1	13.998
17	10 56 6.30	1.9984	12 13 43.7	11.928	17	12 31 25.80	1.9925	1 42 16.7	14.017
18	10 58 6.16	1.9971	12 1 46.1	11.993	18	12 33 25.39	1.9937	1 28 15.1	14.036
19	11 0 5.95	1.9960	11 49 44.6	12.057	19	12 35 25.05	1.9950	1 14 12.4	14.054
20	11 2 5.68	1.9949	11 37 39.3	12.120	20	12 37 24.79	1.9962	1 0 8.6	14.072
21	11 4 5.34	1.9938	11 25 30.1	12.184	21	12 39 24.60	1.9975	0 46 3.8	14.088
22	11 6 4.93	1.9927	11 13 17.2	12.245	22	12 41 24.49	1.9989	0 31 58.1	14.102
23	11 8 4.47	1.9917	11 1 0.7	12.305	23	12 43 24.47	2.0005	0 17 51.6	14.115
24	11 10 3.95	1.9908	N.10 48 40.7	12.363	24	12 45 24.55	2.0021	N. 0 3 44.3	14.128

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
MONDAY 25.					WEDNESDAY 27.				
0	12 45 24.55	2.0021	N. 0° 3' 44.3"	14.126	0	14 24 25.79	2.1469	S. 11° 5' 56.0"	13.283
1	12 47 24.72	2.0037	S. 0 10 23.7	14.139	1	14 26 34.74	2.1513	11 19 11.5	13.233
2	12 49 24.99	2.0053	0 24 32.4	14.150	2	14 28 43.96	2.1558	11 32 24.0	13.183
3	12 51 25.35	2.0069	0 38 41.7	14.159	3	14 30 53.45	2.1603	11 45 33.4	13.130
4	12 53 25.82	2.0087	0 52 51.5	14.167	4	14 33 3.21	2.1650	11 58 30.5	13.075
5	12 55 26.40	2.0105	1 7 1.7	14.174	5	14 35 13.25	2.1697	12 11 42.3	13.020
6	12 57 27.09	2.0124	1 21 12.3	14.180	6	14 37 23.57	2.1743	12 24 41.8	12.962
7	12 59 27.90	2.0143	1 35 23.2	14.184	7	14 39 34.17	2.1790	12 37 37.8	12.903
8	13 1 28.83	2.0163	1 49 34.3	14.187	8	14 41 45.06	2.1838	12 50 30.2	12.843
9	13 3 29.87	2.0184	2 3 45.6	14.189	9	14 43 56.23	2.1886	13 3 18.9	12.781
10	13 5 31.04	2.0206	2 17 57.0	14.189	10	14 46 7.69	2.1935	13 16 3.9	12.718
11	13 7 32.35	2.0228	2 32 8.3	14.188	11	14 48 19.45	2.1984	13 28 45.0	12.653
12	13 9 33.79	2.0251	2 46 19.6	14.187	12	14 50 31.51	2.2033	13 41 22.3	12.587
13	13 11 35.37	2.0275	3 0 30.8	14.185	13	14 52 43.86	2.2083	13 53 55.6	12.520
14	13 13 37.09	2.0298	3 14 41.8	14.180	14	14 54 56.52	2.2134	14 6 24.7	12.451
15	13 15 38.95	2.0322	3 28 52.5	14.175	15	14 57 9.48	2.2185	14 18 49.7	12.381
16	13 17 40.96	2.0347	3 43 2.9	14.170	16	14 59 22.74	2.2236	14 31 10.4	12.309
17	13 19 43.13	2.0373	3 57 12.9	14.163	17	15 1 36.31	2.2287	14 43 26.8	12.236
18	13 21 45.45	2.0400	4 11 22.4	14.153	18	15 3 50.19	2.2339	14 55 38.7	12.161
19	13 23 47.93	2.0427	4 25 31.3	14.143	19	15 6 4.38	2.2392	15 7 46.1	12.084
20	13 25 50.58	2.0454	4 39 39.6	14.133	20	15 8 18.89	2.2444	15 19 48.8	12.006
21	13 27 53.39	2.0482	4 53 47.2	14.120	21	15 10 33.71	2.2497	15 31 46.9	11.928
22	13 29 56.37	2.0512	5 7 54.0	14.106	22	15 12 48.85	2.2550	15 43 40.1	11.846
23	13 31 59.53	2.0542	S. 5 21 59.9	14.090	23	15 15 4.31	2.2603	S. 15 55 28.4	11.764
TUESDAY 26.					THURSDAY 28.				
0	13 34 2.87	2.0572	S. 5 36 4.8	14.074	0	15 17 20.09	2.2657	S. 16 7 11.8	11.681
1	13 36 6.39	2.0602	5 50 8.7	14.056	1	15 19 36.19	2.2711	16 18 50.1	11.596
2	13 38 10.10	2.0633	6 4 11.5	14.038	2	15 21 52.62	2.2765	16 30 23.3	11.509
3	13 40 13.99	2.0665	6 18 13.2	14.018	3	15 24 9.38	2.2820	16 41 51.2	11.420
4	13 42 18.08	2.0697	6 32 13.6	13.996	4	15 26 26.46	2.2874	16 53 13.7	11.330
5	13 44 22.36	2.0730	6 46 12.7	13.974	5	15 28 43.87	2.2928	17 4 30.8	11.240
6	13 46 26.84	2.0763	7 0 10.4	13.950	6	15 31 1.61	2.2983	17 15 42.5	11.148
7	13 48 31.52	2.0797	7 14 6.6	13.924	7	15 33 19.68	2.3038	17 26 48.6	11.054
8	13 50 36.41	2.0833	7 28 1.2	13.897	8	15 35 38.08	2.3094	17 37 48.9	10.957
9	13 52 41.52	2.0869	7 41 54.2	13.868	9	15 37 56.82	2.3150	17 48 43.4	10.860
10	13 54 46.84	2.0905	7 55 45.4	13.838	10	15 40 15.89	2.3205	17 59 32.1	10.762
11	13 56 52.38	2.0942	8 9 34.8	13.808	11	15 42 35.29	2.3261	18 10 14.8	10.662
12	13 58 58.14	2.0979	8 23 22.4	13.776	12	15 44 55.02	2.3317	18 20 51.5	10.560
13	14 1 4.13	2.1017	8 37 8.0	13.743	13	15 47 15.09	2.3373	18 31 22.0	10.456
14	14 3 10.35	2.1055	8 50 51.5	13.708	14	15 49 35.50	2.3429	18 41 46.3	10.350
15	14 5 16.79	2.1094	9 4 32.9	13.672	15	15 51 56.24	2.3484	18 52 4.3	10.246
16	14 7 23.47	2.1133	9 18 12.1	13.634	16	15 54 17.31	2.3540	19 2 15.9	10.139
17	14 9 30.39	2.1173	9 31 49.0	13.595	17	15 56 38.72	2.3596	19 12 21.0	10.030
18	14 11 37.55	2.1213	9 45 23.5	13.555	18	15 59 0.47	2.3653	19 22 19.5	9.919
19	14 13 44.96	2.1255	9 58 55.6	13.513	19	16 1 22.55	2.3707	19 32 11.3	9.807
20	14 15 52.62	2.1297	10 12 25.1	13.470	20	16 3 44.96	2.3763	19 41 56.4	9.695
21	14 18 0.52	2.1339	10 25 52.0	13.425	21	16 6 7.71	2.3819	19 51 34.7	9.580
22	14 20 8.68	2.1382	10 39 16.2	13.379	22	16 8 30.79	2.3875	20 1 6.0	9.464
23	14 22 17.10	2.1425	10 52 37.5	13.331	23	16 10 54.20	2.3930	20 10 30.4	9.347
24	14 24 25.79	2.1469	S. 11 5 56.0	13.283	24	16 13 17.94	2.3985	S. 20 19 47.7	9.226

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
FRIDAY 29.					SUNDAY 31.				
0	16 13 17.94	2.3985	S. 20° 19' 47.7"	9.228	0	18 13 50.94	2.5950	S. 25° 1' 50.5"	2.125
1	16 15 42.01	2.4040	20 28 57.8	9.108	1	18 16 26.69	2.5967	25 3 52.9	1.955
2	16 18 6.41	2.4095	20 38 0.6	8.986	2	18 19 2.54	2.5983	25 5 45.1	1.785
3	16 20 31.14	2.4149	20 46 56.1	8.863	3	18 21 38.49	2.5999	25 7 27.2	1.617
4	16 22 56.19	2.4203	20 55 44.1	8.738	4	18 24 14.53	2.6013	25 8 59.1	1.447
5	16 25 21.56	2.4255	21 4 24.6	8.613	5	18 26 50.65	2.6025	25 10 20.8	1.278
6	16 27 47.26	2.4309	21 12 57.6	8.486	6	18 29 26.83	2.6037	25 11 32.3	1.107
7	16 30 13.28	2.4363	21 21 22.9	8.357	7	18 32 3.08	2.6047	25 12 33.6	0.936
8	16 32 39.61	2.4415	21 29 40.4	8.227	8	18 34 39.39	2.6057	25 13 24.6	0.764
9	16 35 6.25	2.4467	21 37 50.1	8.095	9	18 37 15.76	2.6065	25 14 5.2	0.592
10	16 37 33.21	2.4519	21 45 51.8	7.962	10	18 39 52.17	2.6071	25 14 35.6	0.421
11	16 40 0.48	2.4571	21 53 45.6	7.830	11	18 42 28.61	2.6075	25 14 55.7	0.250
12	16 42 28.06	2.4623	22 1 31.3	7.695	12	18 45 5.06	2.6077	25 15 5.6	-0.079
13	16 44 55.94	2.4675	22 9 8.9	7.558	13	18 47 41.53	2.6080	25 15 5.2	+0.093
14	16 47 24.12	2.4723	22 16 38.2	7.419	14	18 50 18.02	2.6082	25 14 54.4	0.266
15	16 49 52.61	2.4773	22 23 59.2	7.280	15	18 52 54.52	2.6082	25 14 33.2	0.439
16	16 52 21.39	2.4822	22 31 11.8	7.140	16	18 55 31.01	2.6081	25 14 1.7	0.610
17	16 54 50.46	2.4870	22 38 16.0	7.000	17	18 58 7.49	2.6078	25 13 20.0	0.780
18	16 57 19.82	2.4917	22 45 11.8	6.858	18	19 0 43.94	2.6073	25 12 28.1	0.951
19	16 59 49.46	2.4965	22 51 59.0	6.714	19	19 3 20.36	2.6067	25 11 25.9	1.123
20	17 2 19.38	2.5012	22 58 37.4	6.568	20	19 5 56.74	2.6061	25 10 13.3	1.295
21	17 4 49.59	2.5058	23 5 7.1	6.422	21	19 8 33.09	2.6054	25 8 50.4	1.467
22	17 7 20.07	2.5103	23 11 28.0	6.274	22	19 11 9.39	2.6045	25 7 17.3	1.637
23	17 9 50.81	2.5145	S. 23° 17' 40.0"	6.126	23	19 13 45.62	2.6034	S. 25° 5' 34.0"	1.807
SATURDAY 30.					MONDAY, APRIL 1.				
0	17 12 21.80	2.5188	S. 23° 23' 43.2"	5.977	0	19 16 21.78	2.6022	S. 25° 3' 40.4"	1.978
1	17 14 53.06	2.5231	23 29 37.3	5.835	PHASES OF THE MOON.				
2	17 17 24.58	2.5273	23 35 22.3	5.675					
3	17 19 56.34	2.5315	23 40 58.3	5.524					
4	17 22 28.35	2.5355	23 46 25.1	5.370					
5	17 25 0.60	2.5395	23 51 42.6	5.215	☾ Last Quarter, . . . 2 7 28.8				
6	17 27 33.09	2.5434	23 56 50.8	5.059					
7	17 30 5.81	2.5473	24 1 49.6	4.902					
8	17 32 38.74	2.5508	24 6 39.0	4.745					
9	17 35 11.89	2.5543	24 11 19.0	4.587	● New Moon, . . . 9 0 53.5				
10	17 37 45.25	2.5577	24 15 49.5	4.428					
11	17 40 18.81	2.5611	24 20 10.4	4.268					
12	17 42 52.58	2.5644	24 24 21.7	4.108					
13	17 45 26.54	2.5675	24 28 23.3	3.946	☾ First Quarter, . . . 16 14 25.1				
14	17 48 0.68	2.5707	24 32 15.2	3.784					
15	17 50 35.01	2.5737	24 35 57.3	3.620					
16	17 53 9.51	2.5765	24 39 29.6	3.456					
17	17 55 44.18	2.5792	24 42 52.0	3.291	☾ Last Quarter, . . . 31 14 32.1				
18	17 58 19.01	2.5818	24 46 4.6	3.127					
19	18 0 53.99	2.5843	24 49 7.3	2.962					
20	18 3 29.11	2.5867	24 52 0.0	2.795	☾ Perigee, . . . . . 6 2.4				
21	18 6 4.38	2.5889	24 54 42.7	2.627					
22	18 8 39.78	2.5910	24 57 15.3	2.460					
23	18 11 15.30	2.5930	24 59 37.9	2.294					
24	18 13 50.94	2.5950	S. 25° 1' 50.5"	2.125	☾ Apogee, . . . . . 17 22.0				



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
1	Regulus W.	86 23 19	2438	88 5 59	2429	89 48 52	2421	91 31 57	2412
	Spica W.	32 38 28	2510	34 19 27	2495	36 0 47	2480	37 42 28	2467
	Saturn E.	54 4 42	2469	52 22 35	2454	50 40 17	2446	48 57 48	2438
	$\alpha$ Aquilæ E.	67 46 27	3337	66 22 58	3353	64 59 48	3372	63 36 59	3392
	Venus E.	72 10 47	2640	70 37 11	2631	69 3 24	2622	67 29 25	2613
	SUN E.	106 47 24	2774	105 12 22	2765	103 37 8	2755	102 1 41	2746
2	Regulus W.	100 10 22	2371	101 54 39	2363	103 39 7	2355	105 23 47	2347
	Spica W.	46 15 28	2406	47 58 54	2395	49 42 36	2384	51 26 33	2374
	Saturn E.	40 22 31	2399	38 38 55	2392	36 55 9	2385	35 11 13	2378
	$\alpha$ Aquilæ E.	56 49 58	3546	55 30 25	3590	54 11 40	3638	52 53 47	3692
	Venus E.	59 36 35	2769	58 1 27	2760	56 26 7	2752	54 50 36	2744
	SUN E.	94 1 24	2700	92 24 44	2691	90 47 52	2682	89 10 48	2674
3	Spica W.	60 9 51	2337	61 55 11	2318	63 40 44	2310	65 26 29	2302
	$\alpha$ Aquilæ E.	46 40 58	4077	45 30 34	4185	44 21 54	4306	43 15 7	4443
	Venus E.	46 50 20	2704	45 13 45	2697	43 37 1	2689	42 0 7	2684
	SUN E.	81 2 35	2631	79 24 22	2623	77 45 58	2615	76 7 23	2607
4	Spica W.	74 18 11	2264	76 5 4	2257	77 52 7	2251	79 39 20	2244
	Antares W.	28 32 7	2317	30 17 42	2309	32 3 38	2299	33 49 53	2292
	Venus E.	33 53 36	2656	32 15 57	2652	30 38 13	2649	29 0 25	2648
	SUN E.	67 51 57	2572	66 12 23	2566	64 32 41	2559	62 52 50	2554
5	Spica W.	88 37 28	2218	90 25 28	2215	92 13 33	2211	94 1 44	2206
	Antares W.	42 44 55	2234	44 32 32	2227	46 20 19	2221	48 8 15	2216
	SUN E.	54 31 51	2531	52 51 21	2528	51 10 47	2525	49 30 9	2524
6	Spica W.	103 3 38	2198	104 52 8	2198	106 40 38	2198	108 29 8	2198
	Antares W.	57 9 36	2198	58 58 6	2196	60 46 39	2195	62 35 14	2194
	Saturn W.	16 50 22	2258	18 37 23	2247	20 24 40	2240	22 12 9	2233
	SUN E.	41 6 34	2522	39 25 52	2525	37 45 13	2527	36 4 37	2531
11	SUN W.	25 41 54	2219	27 13 49	2227	28 45 33	2238	30 17 4	2248
	Aldebaran E.	51 11 48	2525	49 31 9	2541	47 50 53	2558	46 11 0	2576
	Jupiter E.	93 17 57	2498	91 36 41	2515	89 55 48	2530	88 15 17	2546
	Pollux E.	95 17 58	2510	93 36 58	2525	91 56 19	2540	90 16 2	2556
12	SUN W.	37 50 54	3014	39 20 49	3029	40 50 26	3043	42 19 45	3058
	Aldebaran E.	37 57 45	2667	36 20 21	2686	34 43 22	2706	33 6 50	2726
	Jupiter E.	79 58 12	2626	78 19 53	2643	76 41 56	2658	75 4 20	2675
	Pollux E.	82 0 3	2636	80 21 57	2652	78 44 12	2668	77 6 49	2684
13	SUN W.	49 41 40	3134	51 9 8	3150	52 36 17	3165	54 3 8	3180
	Jupiter E.	67 1 42	2753	65 26 12	2769	63 51 3	2784	62 16 14	2799
	Pollux E.	69 5 13	2763	67 29 56	2778	65 54 59	2793	64 20 22	2808
	Regulus E.	105 10 13	2765	103 34 59	2779	102 0 4	2795	100 25 29	2809
14	SUN W.	61 12 59	3252	62 38 7	3265	64 2 59	3278	65 27 36	3291
	$\alpha$ Arietis W.	22 45 52	2736	24 2 1	2652	25 19 39	2582	26 38 33	2593
	Jupiter E.	54 26 54	2689	52 53 56	2683	51 21 15	2696	49 48 51	2699
	Pollux E.	56 32 1	2679	54 59 15	2693	53 26 47	2695	51 54 35	2699
15	Regulus E.	92 37 11	2878	91 4 24	2891	89 31 53	2903	87 59 38	2916
	SUN W.	72 27 3	3350	73 50 17	3361	75 13 18	3371	76 36 8	3381

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.		Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
1	Regulus	W.	93° 15' 14"	2404	94° 58' 43"	2396	96° 42' 24"	2387	98° 26' 17"	2379
	Spica	W.	39 24 28	2453	41 6 47	2441	42 49 24	2429	44 32 18	2417
	Saturn	E.	47 15 7	2430	45 32 15	2422	43 49 11	2414	42 5 56	2407
	α Aquilæ	E.	62 14 33	2416	60 52 35	2443	59 31 7	2473	58 10 13	2508
	Venus	E.	65 55 14	2805	64 20 52	2795	62 46 18	2786	61 11 32	2778
	SUN	E.	100 26 2	2737	98 50 11	2727	97 14 7	2719	95 37 52	2709
2	Regulus	W.	107 8 38	2339	108 53 41	2331	110 38 55	2324	112 24 20	2316
	Spica	W.	53 10 45	2364	54 55 11	2355	56 39 51	2346	58 24 44	2336
	Saturn	E.	33 27 7	2373	31 42 52	2366	29 58 28	2360	28 13 56	2354
	α Aquilæ	E.	51 36 51	2752	50 20 59	2821	49 6 19	2897	47 52 56	2981
	Venus	E.	53 14 54	2735	51 39 1	2738	50 2 58	2719	48 26 44	2712
	SUN	E.	87 33 33	2665	85 56 6	2656	84 18 27	2648	82 40 37	2639
3	Spica	W.	67 12 26	2294	68 58 35	2285	70 44 56	2278	72 31 28	2270
	α Aquilæ	E.	42 10 24	2596	41 7 56	2770	40 7 55	2869	39 10 35	2917
	Venus	E.	40 23 5	2677	38 45 54	2671	37 8 35	2666	35 31 9	2660
	SUN	E.	74 28 38	2600	72 49 43	2592	71 10 37	2585	69 31 22	2578
4	Spica	W.	81 26 41	2239	83 14 11	2233	85 1 49	2226	86 49 35	2223
	Antares	W.	35 36 25	2267	37 23 13	2258	39 10 15	2249	40 57 29	2241
	Venus	E.	27 22 35	2647	25 44 44	2647	24 6 53	2649	22 29 5	2655
	SUN	E.	61 12 52	2548	59 32 46	2544	57 52 34	2539	56 12 15	2535
5	Spica	W.	95 50 0	2205	97 38 20	2203	99 26 43	2201	101 15 9	2199
	Antares	W.	49 56 19	2211	51 44 30	2207	53 32 47	2204	55 21 9	2200
	SUN	E.	47 49 29	2522	46 8 46	2521	44 28 2	2521	42 47 18	2521
6	Spica	W.	110 17 38	2200	112 6 6	2202	113 54 31	2204	115 42 53	2207
	Antares	W.	64 23 51	2194	66 12 28	2194	68 1 4	2195	69 49 39	2197
	Saturn	W.	23 59 47	2229	25 47 32	2225	27 35 23	2223	29 23 17	2223
	SUN	E.	34 24 7	2536	32 43 44	2542	31 3 29	2550	29 23 25	2561
11	SUN	W.	31 48 22	2961	33 19 24	2973	34 50 11	2986	36 20 41	3000
	Aldebaran	E.	44 31 32	2593	42 52 28	2612	41 13 49	2629	39 35 34	2649
	Jupiter	E.	86 35 8	2562	84 55 21	2578	83 15 56	2594	81 36 53	2610
	Pollux	E.	88 36 6	2572	86 56 33	2588	85 17 21	2604	83 38 31	2620
12	SUN	W.	43 48 46	3074	45 17 27	3089	46 45 50	3105	48 13 54	3119
	Aldebaran	E.	31 30 45	2747	29 55 8	2769	28 19 59	2792	26 45 20	2815
	Jupiter	E.	73 27 6	2690	71 50 13	2707	70 13 42	2722	68 37 32	2738
	Pollux	E.	75 29 48	2700	73 53 8	2716	72 16 49	2732	70 40 51	2747
13	SUN	W.	55 29 41	3195	56 55 56	3209	58 21 54	3224	59 47 35	3238
	Jupiter	E.	60 41 45	2614	59 7 35	2636	57 33 43	2649	56 0 10	2655
	Pollux	E.	62 46 4	2623	61 12 6	2637	59 38 26	2651	58 5 4	2666
	Regulus	E.	98 51 13	2623	97 17 15	2638	95 43 36	2652	94 10 15	2665
14	SUN	W.	66 51 58	3304	68 16 5	3316	69 39 58	3328	71 3 37	3339
	α Arietis	W.	27 58 32	2474	29 19 25	2435	30 41 2	2403	32 3 15	2377
	Jupiter	E.	48 16 43	2621	46 44 51	2633	45 13 14	2645	43 41 52	2656
	Pollux	E.	50 22 40	2631	48 51 1	2644	47 19 38	2656	45 48 30	2667
	Regulus	E.	86 27 39	2628	84 55 56	2639	83 24 27	2651	81 53 13	2662
15	SUN	W.	77 58 46	3390	79 21 14	3399	80 43 32	3408	82 5 40	3415

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Diff.	III <sup>b</sup> .	P. L. of Diff.	VI <sup>b</sup> .	P. L. of Diff.	IX <sup>b</sup> .	P. L. of Diff.
15	$\alpha$ Arietis W.	33 25 58	3359	34 49 9	3334	36 12 41	3319	37 36 31	3306
	Jupiter E.	42 10 44	2967	40 39 50	2977	39 9 9	2988	37 38 41	2998
	Pollux E.	44 17 36	2978	42 46 56	2990	41 16 31	3001	39 46 19	3012
	Regulus E.	80 22 12	2973	78 51 25	2982	77 20 50	2992	75 50 27	3001
16	Sun W.	83 27 40	3423	84 49 31	3429	86 11 15	3435	87 32 52	3441
	$\alpha$ Arietis W.	44 38 50	3264	46 3 44	3258	47 28 45	3253	48 53 51	3249
	Jupiter E.	30 9 20	3043	28 40 0	3051	27 10 50	3058	25 41 49	3066
	Pollux E.	32 18 32	3061	30 49 35	3070	29 20 49	3080	27 52 15	3090
	Regulus E.	68 21 17	3042	66 51 56	3048	65 22 43	3055	63 53 38	3060
17	Sun W.	94 19 28	3463	95 40 34	3466	97 1 36	3468	98 22 36	3469
	$\alpha$ Arietis W.	56 0 25	3233	57 25 55	3231	58 51 28	3227	60 17 5	3224
	Aldebaran W.	24 29 53	3147	25 57 6	3142	27 24 25	3137	28 51 50	3133
	Regulus E.	56 29 48	3082	55 1 17	3086	53 32 50	3089	52 4 27	3091
	Spica E.	110 32 6	3093	109 3 48	3095	107 35 32	3096	106 7 18	3097
18	Sun W.	105 7 21	3470	106 28 19	3469	107 49 18	3467	109 10 19	3464
	$\alpha$ Arietis W.	67 26 9	3206	68 52 11	3203	70 18 17	3198	71 44 29	3193
	Aldebaran W.	36 10 12	3113	37 38 6	3108	39 6 6	3104	40 34 11	3100
	Regulus E.	44 43 2	3096	43 14 48	3097	41 46 35	3096	40 18 21	3096
	Spica E.	98 46 16	3098	97 18 1	3095	95 49 45	3092	94 21 26	3091
19	Sun W.	115 56 13	3446	117 17 37	3441	118 39 7	3436	120 0 43	3431
	$\alpha$ Arietis W.	78 56 53	3168	80 23 41	3161	81 50 37	3155	83 17 40	3148
	Aldebaran W.	47 56 2	3073	49 24 44	3068	50 53 33	3061	52 22 30	3055
	Regulus E.	32 56 59	3091	31 28 39	3090	30 0 17	3089	28 31 54	3089
	Spica E.	86 59 0	3072	85 30 16	3068	84 1 27	3062	82 32 31	3056
20	Sun W.	126 50 27	3396	128 12 48	3389	129 35 17	3381	130 57 55	3372
	$\alpha$ Arietis W.	90 34 57	3114	92 2 50	3105	93 30 53	3097	94 59 6	3090
	Aldebaran W.	59 49 26	3017	61 19 18	3008	62 49 20	3000	64 19 33	2990
	Jupiter W.	17 34 49	3038	19 4 15	3026	20 33 56	3014	22 3 52	3002
	Spica E.	75 6 0	3024	73 36 17	3016	72 6 24	3008	70 36 21	3001
21	Aldebaran W.	71 53 34	2942	73 24 59	2932	74 56 37	2921	76 28 29	2911
	Jupiter W.	29 37 5	2946	31 8 25	2935	32 39 59	2924	34 11 47	2913
	Pollux W.	27 47 17	2967	29 18 11	2953	30 49 23	2939	32 20 52	2927
	Spica E.	63 3 35	2958	61 32 29	2946	60 1 11	2939	58 29 42	2930
	Antares E.	108 56 36	2946	107 25 16	2935	105 53 42	2925	104 21 55	2914
22	Aldebaran W.	84 11 14	2855	85 44 30	2844	87 18 1	2833	88 51 46	2821
	Jupiter W.	41 54 24	2855	43 27 40	2844	45 1 11	2832	46 34 57	2820
	Pollux W.	40 2 25	2869	41 35 33	2849	43 8 57	2836	44 42 38	2824
	Spica E.	50 49 16	2882	49 16 34	2873	47 43 41	2863	46 10 35	2855
	Antares E.	96 39 30	2859	95 6 18	2847	93 32 51	2835	91 59 9	2824
23	Aldebaran W.	96 44 22	2763	98 19 39	2750	99 55 12	2739	101 31 0	2728
	Jupiter W.	54 27 39	2761	56 2 58	2749	57 38 33	2737	59 14 24	2726
	Pollux W.	52 35 7	2761	54 10 26	2749	55 46 1	2737	57 21 52	2724
	Regulus W.	16 51 31	2681	18 24 14	2652	19 57 35	2625	21 31 31	2600
	Spica E.	38 22 17	2614	36 48 7	2607	35 13 48	2601	33 39 21	2595
	Antares E.	84 6 51	2725	82 31 37	2713	80 56 8	2702	79 20 24	2700
24	Jupiter W.	67 17 30	2667	68 54 54	2658	70 32 33	2645	72 10 27	2634

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.		Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
15	$\alpha$ Arietis	W.	39° 0' 36"	3294	40° 24' 54"	3294	41° 49' 24"	3276	43° 14' 3"	3270
	Jupiter	E.	36 8 26	3008	34 38 23	3017	33 8 31	3026	31 38 50	3034
	Pollux	E.	38 16 21	3092	36 46 35	3039	35 17 2	3049	33 47 41	3052
	Regulus	E.	74 20 16	3010	72 50 16	3019	71 20 27	3026	69 50 47	3034
16	Sun	W.	88 54 22	3446	90 15 46	3451	91 37 5	3455	92 58 19	3460
	$\alpha$ Arietis	W.	50 19 2	3246	51 44 17	3242	53 9 36	3239	54 34 59	3236
	Jupiter	E.	24 12 58	3073	22 44 16	3081	21 15 43	3088	19 47 19	3096
	Pollux	E.	26 23 53	3101	24 55 44	3110	23 27 47	3121	22 0 3	3131
	Regulus	E.	62 24 40	3065	60 55 48	3071	59 27 3	3075	57 58 23	3079
17	Sun	W.	99 43 35	3471	101 4 32	3471	102 25 28	3471	103 46 24	3471
	$\alpha$ Arietis	W.	61 42 46	3220	63 8 31	3218	64 34 19	3214	66 0 12	3210
	Aldebaran	W.	30 19 20	3128	31 46 56	3124	33 14 37	3120	34 42 22	3116
	Regulus	E.	50 36 6	3093	49 7 48	3094	47 39 31	3096	46 11 16	3096
	Spica	E.	104 39 5	3096	103 10 53	3096	101 42 41	3098	100 14 29	3097
18	Sun	W.	110 31 23	3462	111 52 30	3459	113 13 40	3455	114 34 54	3451
	$\alpha$ Arietis	W.	73 10 46	3188	74 37 9	3184	76 3 37	3178	77 30 12	3173
	Aldebaran	W.	42 2 21	3095	43 30 37	3090	44 58 59	3085	46 27 27	3079
	Regulus	E.	38 50 7	3096	37 21 52	3095	35 53 36	3093	34 25 18	3092
	Spica	E.	92 53 5	3067	91 24 40	3064	89 56 11	3061	88 27 38	3077
19	Sun	W.	121 22 25	3424	122 44 14	3417	124 6 11	3411	125 28 15	3404
	$\alpha$ Arietis	W.	84 44 51	3142	86 12 10	3135	87 39 37	3128	89 7 13	3121
	Aldebaran	W.	53 51 35	3047	55 20 49	3040	56 50 12	3033	58 19 44	3025
	Regulus	E.	27 3 31	3089	25 35 8	3080	24 6 46	3092	22 38 27	3096
	Spica	E.	81 3 28	3051	79 34 18	3044	78 5 0	3038	76 35 34	3031
20	Sun	W.	132 20 43	3365	133 43 40	3356	135 6 47	3347	136 30 4	3337
	$\alpha$ Arietis	W.	96 27 28	3081	97 56 1	3073	99 24 43	3065	100 53 35	3058
	Aldebaran	W.	65 49 58	2981	67 20 34	2972	68 51 22	2962	70 22 22	2953
	Jupiter	W.	23 34 2	3091	25 4 26	2979	26 35 5	2968	28 5 58	2957
	Spica	E.	69 6 9	2993	67 35 47	2984	66 5 14	2975	64 34 30	2966
21	Aldebaran	W.	78 0 34	2990	79 32 53	2989	81 5 26	2978	82 38 13	2967
	Jupiter	W.	35 43 49	2991	37 16 6	2981	38 48 37	2979	40 21 23	2967
	Pollux	W.	33 52 37	2913	35 24 39	2900	36 56 58	2897	38 29 33	2874
	Spica	E.	56 58 1	2990	55 26 8	2911	53 54 3	2901	52 21 46	2891
	Antares	E.	102 49 54	2904	101 17 40	2892	99 45 11	2881	98 12 28	2869
22	Aldebaran	W.	90 25 47	2899	92 0 3	2798	93 34 34	2786	95 9 20	2774
	Jupiter	W.	48 8 59	2908	49 43 16	2797	51 17 48	2785	52 52 36	2773
	Pollux	W.	46 16 35	2811	47 50 48	2798	49 25 18	2786	51 0 4	2773
	Spica	E.	44 37 18	2845	43 3 49	2837	41 30 9	2826	39 56 18	2821
	Antares	E.	90 25 12	2812	88 51 0	2800	87 16 32	2788	85 41 49	2777
23	Aldebaran	W.	103 7 3	2716	104 43 21	2704	106 19 55	2694	107 56 43	2682
	Jupiter	W.	60 50 30	2713	62 26 52	2702	64 3 29	2690	65 40 22	2679
	Pollux	W.	58 58 0	2713	60 34 23	2700	62 11 3	2688	63 47 59	2676
	Regulus	W.	23 5 59	2778	24 40 56	2758	26 16 19	2738	27 52 8	2721
	Spica	F.	32 4 47	2792	30 30 9	2790	28 55 28	2788	27 20 45	2790
	Antares	E.	77 44 24	2719	76 8 9	2707	74 31 39	2696	72 54 54	2684
24	Jupiter	W.	73 48 36	2693	75 27 0	2612	77 5 38	2601	78 44 31	2591

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.		Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
24	Pollux	W.	65° 25' 11"	2664	67° 2' 39"	2653	68° 40' 22"	2641	70° 18' 21"	2630
	Regulus	W.	29 28 20	2704	31 4 55	2687	32 41 52	2679	34 19 9	2657
	Antares	E.	71 17 53	2674	69 40 38	2663	68 3 8	2652	66 25 24	2641
	Saturn	E.	112 50 44	2681	111 13 39	2669	109 36 18	2657	107 58 41	2646
25	Jupiter	W.	80 23 39	2580	82 3 1	2571	83 42 36	2561	85 22 25	2551
	Pollux	W.	78 32 1	2576	80 11 29	2565	81 51 12	2556	83 31 8	2545
	Regulus	W.	42 30 13	2593	44 9 17	2581	45 48 38	2570	47 28 14	2559
	Antares	E.	58 13 12	2591	56 34 5	2583	54 54 46	2573	53 15 14	2565
	Saturn	E.	99 46 51	2592	98 7 45	2582	96 28 25	2572	94 48 51	2561
	α Aquilæ	E.	104 36 10	3377	103 13 27	3355	101 50 19	3335	100 26 48	3318
26	Jupiter	W.	93 44 47	2505	95 25 53	2497	97 7 10	2489	98 48 39	2480
	Pollux	W.	91 54 9	2499	93 35 23	2490	95 16 50	2482	96 58 28	2475
	Regulus	W.	55 49 54	2508	57 30 56	2499	59 12 10	2490	60 53 37	2482
	Antares	E.	44 54 47	2527	43 14 11	2520	41 33 26	2515	39 52 33	2510
	Saturn	E.	86 27 39	2515	84 46 47	2507	83 5 43	2498	81 24 27	2489
	α Aquilæ	E.	93 24 32	3247	91 59 19	3226	90 33 53	3208	89 8 17	3200
27	Regulus	W.	69 23 48	2442	71 6 23	2435	72 49 8	2428	74 32 3	2421
	Spica	W.	16 12 28	2731	17 48 27	2673	19 25 43	2627	21 4 1	2589
	Antares	E.	31 26 44	2496	29 45 25	2497	28 4 7	2498	26 22 51	2504
	Saturn	E.	72 55 20	2452	71 12 59	2445	69 30 29	2438	67 47 49	2433
	α Aquilæ	E.	81 58 38	3204	80 32 34	3205	79 6 31	3208	77 40 31	3212
28	Regulus	W.	83 8 54	2391	84 52 41	2387	86 36 35	2381	88 20 37	2376
	Spica	W.	29 25 50	2476	31 7 37	2469	32 49 44	2449	34 32 9	2438
	Saturn	E.	59 12 25	2405	57 28 57	2400	55 45 22	2395	54 1 40	2391
	α Aquilæ	E.	70 32 29	3260	69 7 31	3276	67 42 51	3294	66 18 32	3314
	Fomalhaut	E.	100 50 19	2560	99 10 29	2553	97 30 29	2546	95 50 20	2540
	Venus	E.	108 20 57	2791	106 46 17	2785	105 11 29	2779	103 36 34	2773
	Sun	E.	136 52 21	2731	135 16 22	2723	133 40 13	2716	132 3 55	2710
29	Regulus	W.	97 2 25	2353	98 47 4	2351	100 31 49	2348	102 16 39	2345
	Spica	W.	43 7 54	2393	44 51 39	2387	46 35 33	2380	48 19 37	2374
	Saturn	E.	45 21 43	2372	43 37 28	2369	41 53 9	2367	40 8 47	2365
	α Aquilæ	E.	59 23 56	3462	58 2 49	3501	56 42 26	3546	55 22 53	3596
	Fomalhaut	E.	87 27 43	2517	85 46 54	2515	84 6 2	2512	82 25 6	2510
	Venus	E.	95 40 14	2750	94 4 40	2745	92 29 0	2741	90 53 15	2738
	Sun	E.	124 0 20	2681	122 23 15	2676	120 46 3	2672	119 8 45	2668
30	Spica	W.	57 1 50	2350	58 46 36	2346	60 31 28	2343	62 16 25	2340
	Saturn	E.	31 26 18	2359	29 41 45	2359	27 57 12	2361	26 12 41	2364
	α Aquilæ	E.	49 0 31	3938	47 47 50	4031	46 36 41	4134	45 27 12	4250
	Fomalhaut	E.	73 59 57	2508	72 18 55	2509	70 37 54	2511	68 56 56	2514
	Venus	E.	82 53 19	2721	81 17 7	2719	79 40 52	2716	78 4 33	2713
	α Pegasi	E.	92 35 40	2725	90 59 33	2722	89 23 22	2719	87 47 8	2718
	Sun	E.	111 0 54	2649	109 23 5	2645	107 45 11	2643	106 7 14	2640
31	Spica	W.	71 2 15	2326	72 47 36	2324	74 33 1	2322	76 18 28	2320
	Antares	W.	25 17 33	2389	27 1 23	2379	28 45 28	2368	30 29 48	2360
	Fomalhaut	E.	60 33 17	2537	58 52 55	2544	57 12 43	2553	55 32 44	2563
	Venus	E.	70 2 13	2704	68 25 38	2701	66 49 0	2700	65 12 20	2699
	α Pegasi	E.	79 45 54	2724	78 9 46	2729	76 33 44	2733	74 57 48	2740
	Sun	E.	97 56 34	2628	96 18 17	2626	94 39 57	2624	93 1 35	2622

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
24	Pollux W.	71° 56' 35"	2619	73° 35' 4"	2608	75° 13' 48"	2597	76° 52' 47"	2586
	Regulus W.	35 56 46	2643	37 34 42	2631	39 12 55	2618	40 51 26	2606
	Antares E.	64 47 25	2631	63 9 12	2621	61 30 46	2611	59 52 6	2601
	Saturn E.	106 20 49	2635	104 42 42	2624	103 4 20	2613	101 25 43	2602
25	Jupiter W.	87 2 28	2541	88 42 44	2533	90 23 12	2523	92 3 53	2514
	Pollux W.	85 11 18	2536	86 51 41	2526	88 32 18	2517	90 13 7	2508
	Regulus W.	49 8 5	2548	50 48 11	2538	52 28 31	2527	54 9 6	2518
	Antares E.	51 35 31	2556	49 55 36	2548	48 15 30	2541	46 35 14	2533
	Saturn E.	93 9 3	2552	91 29 2	2542	89 48 47	2533	88 8 19	2524
	α Aquilæ E.	99 2 57	3301	97 38 47	3285	96 14 18	3271	94 49 32	3259
26	Jupiter W.	100 30 20	2472	102 12 12	2465	103 54 14	2458	105 36 27	2450
	Pollux W.	98 40 17	2466	100 22 18	2459	102 4 29	2451	103 46 51	2444
	Regulus W.	62 35 16	2473	64 17 7	2465	65 59 10	2457	67 41 24	2450
	Antares E.	38 11 34	2505	36 30 28	2502	34 49 17	2499	33 8 2	2497
	Saturn E.	79 42 59	2482	78 1 20	2475	76 19 31	2467	74 37 31	2459
	α Aquilæ E.	87 42 32	3214	86 16 40	3210	84 50 43	3207	83 24 42	3204
27	Regulus W.	76 15 8	2414	77 58 22	2409	79 41 44	2403	81 25 15	2397
	Spica W.	22 43 11	2559	24 23 3	2533	26 3 30	2512	27 44 27	2493
	Antares E.	24 41 43	2510	23 0 44	2520	21 19 59	2506	19 39 36	2559
	Saturn E.	66 5 1	2426	64 22 4	2421	62 38 59	2415	60 55 46	2410
	α Aquilæ E.	76 14 36	3218	74 48 48	3226	73 23 10	3226	71 57 43	3247
28	Regulus W.	90 4 46	2372	91 49 1	2367	93 33 23	2363	95 17 51	2359
	Spica W.	36 14 50	2426	37 57 47	2417	39 40 57	2408	41 24 20	2401
	Saturn E.	52 17 52	2387	50 33 58	2382	48 49 58	2379	47 5 53	2375
	α Aquilæ E.	64 54 37	3338	63 31 9	3363	62 8 10	3392	60 45 44	3425
	Fomalhaut E.	94 10 2	2535	92 29 37	2530	90 49 5	2525	89 8 27	2521
	Venus E.	102 1 31	2768	100 26 21	2763	98 51 5	2758	97 15 42	2754
	SUN E.	130 27 28	2704	128 50 53	2697	127 14 9	2692	125 37 18	2687
29	Regulus W.	104 1 33	2342	105 46 32	2339	107 31 35	2336	109 16 42	2333
	Spica W.	50 3 49	2368	51 48 9	2364	53 32 36	2359	55 17 10	2355
	Saturn E.	38 24 22	2363	36 39 54	2361	34 55 23	2360	33 10 51	2359
	α Aquilæ E.	54 4 14	3650	52 46 34	3712	51 30 0	3780	50 14 37	3855
	Fomalhaut E.	80 44 7	2509	79 3 6	2507	77 22 3	2507	75 41 0	2507
	Venus E.	89 17 25	2734	87 41 30	2731	86 5 31	2727	84 29 27	2724
	SUN E.	117 31 22	2663	115 53 53	2659	114 16 18	2655	112 38 38	2652
30	Spica W.	64 1 26	2337	65 46 32	2333	67 31 43	2331	69 16 57	2328
	Saturn E.	24 28 15	2368	22 43 55	2374	20 59 43	2380	19 15 39	2387
	α Aquilæ E.	44 19 33	3478	43 13 52	4523	42 10 20	4624	41 9 7	4688
	Fomalhaut E.	67 16 2	2517	65 35 12	2520	63 54 27	2525	62 13 48	2530
	Venus E.	76 28 11	2710	74 51 45	2709	73 15 17	2707	71 38 46	2705
	α Pegasi E.	86 10 52	2718	84 34 36	2718	82 58 20	2719	81 22 6	2721
	SUN E.	104 29 13	2637	102 51 8	2635	101 13 0	2632	99 34 48	2630
31	Spica W.	78 3 58	2318	79 49 31	2317	81 35 5	2316	83 20 41	2315
	Antares W.	32 14 20	2353	33 59 3	2346	35 43 55	2340	37 28 56	2336
	Fomalhaut E.	53 52 58	2574	52 13 27	2587	50 34 14	2601	48 55 20	2617
	Venus E.	63 35 39	2696	61 58 57	2697	60 22 13	2696	58 45 28	2696
	α Pegasi E.	73 22 1	2747	71 46 23	2754	70 10 55	2764	68 35 40	2775
	SUN E.	91 23 10	2621	89 44 44	2620	88 6 16	2618	86 27 46	2618

## AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S						Sidereal Time of the Semi-diameter passing the Meridian.	Equation of Time, to be added to		Diff. for 1 hour.
		Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Semi-diameter.	subtracted from Apparent Time.				
Mon.	1	<sup>h</sup> 0 <sup>m</sup> 44 <sup>s</sup> 24.07	9.100	N. <sup>°</sup> 4 <sup>'</sup> 46 <sup>"</sup> 30.9	57.68	16' 1.88	<sup>s</sup> 64.52	<sup>m</sup> 3 <sup>s</sup> 47.24	<sup>s</sup> 0.754		
Tues.	2	0 48 2.55	9.105	5 9 33.4	57.45	16 1.59	64.54	3 29.22	0.749		
Wed.	3	0 51 41.17	9.112	5 32 30.7	57.23	16 1.31	64.56	3 11.35	0.742		
Thur.	4	0 55 19.97	9.120	5 55 22.1	57.00	16 1.03	64.57	2 53.64	0.734		
Frid.	5	0 58 58.96	9.128	6 18 7.6	56.76	16 0.75	64.60	2 36.13	0.726		
Sat.	6	1 2 38.14	9.137	6 40 46.8	56.49	16 0.47	64.63	2 18.81	0.717		
Sun.	7	1 6 17.54	9.146	7 3 19.3	56.21	16 0.19	64.66	2 1.71	0.708		
Mon.	8	1 9 57.18	9.156	7 25 44.6	55.90	15 59.92	64.70	1 44.83	0.698		
Tues.	9	1 13 37.07	9.167	7 48 2.2	55.57	15 59.65	64.74	1 28.21	0.687		
Wed.	10	1 17 17.22	9.177	8 10 12.1	55.23	15 59.38	64.78	1 11.85	0.677		
Thur.	11	1 20 57.65	9.189	8 32 13.6	54.89	15 59.11	64.82	0 55.77	0.665		
Frid.	12	1 24 38.36	9.201	8 54 6.7	54.52	15 58.85	64.86	0 39.97	0.653		
Sat.	13	1 28 19.37	9.214	9 15 50.8	54.15	15 58.58	64.91	0 24.47	0.640		
Sun.	14	1 32 0.70	9.228	9 37 25.5	53.75	15 58.32	64.97	0 9.28	0.626		
Mon.	15	1 35 42.36	9.242	9 58 50.7	53.34	15 58.06	65.02	0 5.57	0.612		
Tues.	16	1 39 24.36	9.257	10 20 5.9	52.92	15 57.80	65.08	0 20.08	0.597		
Wed.	17	1 43 6.72	9.274	10 41 10.8	52.48	15 57.53	65.13	0 34.23	0.581		
Thur.	18	1 46 49.45	9.289	11 2 4.9	52.03	15 57.28	65.19	0 48.01	0.566		
Frid.	19	1 50 32.58	9.306	11 22 48.0	51.56	15 57.02	65.25	1 1.40	0.549		
Sat.	20	1 54 16.12	9.323	11 43 19.9	51.08	15 56.77	65.32	1 14.39	0.532		
Sun.	21	1 58 0.09	9.342	12 3 40.2	50.60	15 56.51	65.37	1 26.95	0.513		
Mon.	22	2 1 44.49	9.361	12 23 48.7	50.10	15 56.26	65.44	1 39.06	0.494		
Tues.	23	2 5 29.35	9.380	12 43 45.0	49.58	15 56.00	65.51	1 50.73	0.475		
Wed.	24	2 9 14.68	9.400	13 3 28.8	49.06	15 55.75	65.58	2 1.93	0.455		
Thur.	25	2 13 0.50	9.420	13 22 59.8	48.51	15 55.50	65.65	2 12.63	0.435		
Frid.	26	2 16 46.81	9.440	13 42 17.4	47.95	15 55.25	65.72	2 22.84	0.415		
Sat.	27	2 20 33.63	9.462	14 1 21.7	47.40	15 55.00	65.79	2 32.54	0.393		
Sun.	28	2 24 20.98	9.484	14 20 12.4	46.83	15 54.76	65.87	2 41.72	0.371		
Mon.	29	2 28 8.87	9.507	14 38 49.0	46.23	15 54.51	65.94	2 50.37	0.348		
Tues.	30	2 31 57.31	9.530	14 57 11.2	45.62	15 54.27	66.02	2 58.47	0.325		
Wed.	31	2 35 46.30	9.553	N.15 15 18.9	45.00	15 54.03	66.09	3 6.01	0.302		

NOTE.—Mean Time of the Semidiameter passing may be found by subtracting 0s.18 from the Sidereal Time.

## AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time, to be subtracted from added to Mean Time.	Diff. for 1 hour.	Sidereal Time or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.			
Mon.	1	<sup>h</sup> 0 <sup>m</sup> 44 <sup>s</sup> 23.49	9.102	N. 4 46 27.3	57.69	<sup>m</sup> 3 47.29	0.754	<sup>h</sup> 0 40 36.20
Tues.	2	0 48 2.01	9.107	5 9 30.1	57.46	3 29.26	0.749	0 44 32.75
Wed.	3	0 51 40.68	9.114	5 32 27.6	57.24	3 11.38	0.742	0 48 29.30
Thur.	4	0 55 19.52	9.122	5 55 19.4	57.01	2 53.66	0.734	0 52 25.86
Frid.	5	0 58 58.56	9.130	6 18 5.2	56.77	2 36.15	0.726	0 56 22.41
Sat.	6	1 2 37.79	9.139	6 40 44.6	56.50	2 18.83	0.717	1 0 18.96
Sun.	7	1 6 17.24	9.148	7 3 17.3	56.22	2 1.72	0.708	1 4 15.52
Mon.	8	1 9 56.92	9.158	7 25 42.9	55.91	1 44.85	0.698	1 8 12.07
Tues.	9	1 13 36.85	9.169	7 48 0.9	55.58	1 28.23	0.687	1 12 8.62
Wed.	10	1 17 17.04	9.179	8 10 11.0	55.24	1 11.86	0.677	1 16 5.18
Thur.	11	1 20 57.51	9.191	8 32 12.8	54.90	0 55.78	0.665	1 20 1.73
Frid.	12	1 24 38.26	9.203	8 54 6.1	54.53	0 39.98	0.653	1 23 58.28
Sat.	13	1 28 19.31	9.216	9 15 50.5	54.16	0 24.47	0.640	1 27 54.84
Sun.	14	1 32 0.68	9.230	9 37 25.3	53.76	0 9.29	0.626	1 31 51.39
Mon.	15	1 35 42.38	9.244	9 58 50.8	53.35	0 5.57	0.612	1 35 47.95
Tues.	16	1 39 24.41	9.259	10 20 6.2	52.93	0 20.09	0.597	1 39 44.50
Wed.	17	1 43 6.81	9.275	10 41 11.3	52.49	0 34.24	0.581	1 43 41.05
Thur.	18	1 46 49.58	9.290	11 2 5.6	52.04	0 48.03	0.566	1 47 37.61
Frid.	19	1 50 32.74	9.307	11 22 48.9	51.57	1 1.42	0.549	1 51 34.16
Sat.	20	1 54 16.31	9.324	11 43 20.9	51.09	1 14.40	0.532	1 55 30.71
Sun.	21	1 58 0.31	9.343	12 3 41.4	50.61	1 26.96	0.513	1 59 27.27
Mon.	22	2 1 44.74	9.362	12 23 50.1	50.11	1 39.09	0.494	2 3 23.83
Tues.	23	2 5 29.63	9.381	12 43 46.6	49.59	1 50.75	0.475	2 7 20.38
Wed.	24	2 9 14.99	9.401	13 3 30.5	49.07	2 1.95	0.455	2 11 16.94
Thur.	25	2 13 0.84	9.421	13 23 1.5	48.52	2 12.65	0.435	2 15 13.49
Frid.	26	2 16 47.18	9.441	13 42 19.3	47.96	2 22.86	0.415	2 19 10.04
Sat.	27	2 20 34.03	9.463	14 1 23.6	47.40	2 32.57	0.393	2 23 6.60
Sun.	28	2 24 21.41	9.485	14 20 14.4	46.83	2 41.74	0.371	2 27 3.15
Mon.	29	2 28 9.32	9.508	14 38 51.2	46.23	2 50.39	0.348	2 30 59.71
Tues.	30	2 31 57.78	9.531	14 57 13.5	45.62	2 58.48	0.325	2 34 56.26
Wed.	31	2 35 46.79	9.554	N. 15 15 21.2	45.00	3 6.03	0.302	2 38 52.82

NOTE.—The Semidiameter for Mean Noon may be assumed the same as that for Apparent Noon.

Diff. for 1 hour  
+9<sup>s</sup>.8565



AT GREENWICH MEAN NOON.									
Day of the Month.	Day of the Year.	THE SUN'S				Logarithm of the Radius Vector of the Earth.	Diff. for 1 hour.	Mean Time of Sidereal Oh.	
		True LONGITUDE.		Diff. for 1 hour.	LATITUDE.				
		$\lambda$	$\lambda'$						
1	92	12° 4' 29.8"	4° 34.4'	147.79	-0.37	0.0000549	+53.4	h m s	23 15 34.54
2	93	13 3 36.0	3 40.5	147.72	0.47	.0001829	53.3		23 11 38.63
3	94	14 2 40.5	2 44.8	147.65	0.55	.0003105	53.1		23 7 42.72
4	95	15 1 43.2	1 47.5	147.57	0.61	.0004377	52.9		23 3 46.81
5	96	16 0 44.1	0 48.3	147.49	0.65	.0005643	52.6		22 59 50.91
6	97	16 59 43.0	59 47.1	147.41	0.65	.0006902	52.3		22 55 55.01
7	98	17 58 40.0	58 44.0	147.33	0.61	.0008153	51.9		22 51 59.10
8	99	18 57 35.0	57 38.9	147.25	0.55	.0009395	51.5		22 48 3.19
9	100	19 56 28.0	56 31.8	147.16	0.46	.0010627	51.2		22 44 7.28
10	101	20 55 18.9	55 22.6	147.07	0.36	.0011850	50.8		22 40 11.37
11	102	21 54 7.7	54 11.2	146.98	0.23	.0013063	50.4		22 36 15.46
12	103	22 52 54.4	52 57.8	146.89	-0.10	.0014267	50.0		22 32 19.55
13	104	23 51 38.8	51 42.1	146.80	+0.03	.0015463	49.6		22 28 23.65
14	105	24 50 21.0	50 24.8	146.71	0.16	.0016651	49.3		22 24 27.74
15	106	25 49 0.9	49 4.0	146.62	0.27	.0017831	49.0		22 20 31.83
16	107	26 47 38.6	47 41.6	146.53	0.36	.0019004	48.8		22 16 35.92
17	108	27 46 14.1	46 17.0	146.44	0.42	.0020172	48.6		22 12 40.01
18	109	28 44 47.4	44 50.2	146.35	0.47	.0021336	48.4		22 8 44.10
19	110	29 43 18.5	43 21.2	146.26	0.48	.0022496	48.2		22 4 48.19
20	111	30 41 47.6	41 50.2	146.17	0.47	.0023653	48.1		22 0 52.28
21	112	31 40 14.6	40 17.0	146.08	0.43	.0024808	48.0		21 56 56.38
22	113	32 38 39.5	38 41.8	146.00	0.36	.0025960	47.9		21 53 0.47
23	114	33 37 2.6	37 4.7	145.92	0.27	.0027110	47.8		21 49 4.56
24	115	34 35 23.9	35 25.9	145.85	0.15	.0028258	47.7		21 45 8.65
25	116	35 33 43.5	33 45.3	145.78	+0.01	.0029404	47.6		21 41 12.75
26	117	36 32 1.4	32 3.1	145.71	-0.12	.0030546	47.4		21 37 16.84
27	118	37 30 17.8	30 19.4	145.64	0.25	.0031682	47.2		21 33 20.93
28	119	38 28 32.6	28 34.1	145.58	0.38	.0032811	46.9		21 29 25.02
29	120	39 26 45.9	26 47.3	145.52	0.48	.0033933	46.6		21 25 29.11
30	121	40 24 57.6	24 58.9	145.46	0.57	.0035047	46.2		21 21 33.20
31	122	41 23 7.9	23 9.0	145.40	-0.63	0.0036151	+45.7		21 17 37.29
NOTE: $\lambda$ corresponds to the true equinox of the date, $\lambda'$ to the mean equinox of January 0d.									Diff. for 1 hour -9 <sup>s</sup> .8296

## GREENWICH MEAN TIME.

Day of the Month.	THE MOON'S								
	SEMI- DIAMETER.		HORIZONTAL PARALLAX.				MERIDIAN PASSAGE.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 hour.	Midnight.	Diff. for 1 hour.		Diff. for 1 hour.	Noon.
1	16' 10.8"	16' 10.8"	59' 16.2"	+0.08	59' 16.5"	-0.02	<sup>h</sup> 19 <sup>m</sup> 22.6	<sup>m</sup> 2.48	<sup>d</sup> 23.0
2	16 10.6	16 10.0	59 15.6	-0.13	59 13.4	0.24	20 21.1	2.36	24.0
3	16 9.0	16 7.6	59 9.8	0.36	59 4.6	0.49	21 16.3	2.23	25.0
4	16 5.8	16 3.5	58 57.9	0.63	58 49.6	0.76	22 8.1	2.10	26.0
5	16 0.8	15 57.6	58 39.6	0.90	58 27.9	1.04	22 57.2	2.02	27.0
6	15 54.0	15 50.0	58 14.7	1.17	58 0.0	1.28	23 44.3	1.94	28.0
7	15 45.6	15 41.0	57 44.0	1.38	57 26.9	1.46	♄		29.0
8	15 36.1	15 31.1	57 8.9	1.52	56 50.4	1.56	0 30.5	1.92	0.5
9	15 25.9	15 20.8	56 31.6	1.57	56 12.8	1.55	1 16.6	1.93	1.5
10	15 15.8	15 11.0	55 54.5	1.50	55 36.9	1.43	2 3.4	1.97	2.5
11	15 6.5	15 2.4	55 20.3	1.33	55 5.0	1.20	2 51.2	2.02	3.5
12	14 58.7	14 55.5	54 51.4	1.06	54 39.7	0.89	3 40.2	2.06	4.5
13	14 52.8	14 50.8	54 30.0	0.71	54 22.6	0.52	4 30.2	2.09	5.5
14	14 49.4	14 48.7	54 17.5	-0.32	54 15.0	-0.11	5 20.4	2.09	6.5
15	14 48.7	14 49.4	54 15.0	+0.11	54 17.6	+0.33	6 10.4	2.06	7.5
16	14 50.9	14 53.0	54 22.8	0.54	54 30.6	0.76	6 59.3	2.01	8.5
17	14 55.8	14 59.3	54 40.9	0.96	54 53.5	1.15	7 46.8	1.95	9.5
18	15 3.3	15 7.9	55 8.4	1.32	55 25.2	1.48	8 33.0	1.90	10.5
19	15 12.9	15 18.4	55 43.8	1.61	56 3.7	1.72	9 18.1	1.87	11.5
20	15 24.1	15 30.0	56 24.8	1.79	56 46.6	1.83	10 3.0	1.88	12.5
21	15 36.0	15 42.0	57 8.7	1.84	57 30.7	1.81	10 48.3	1.92	13.5
22	15 47.8	15 53.4	57 52.0	1.74	58 12.4	1.64	11 35.1	2.00	14.5
23	15 58.5	16 3.2	58 31.3	1.51	58 48.5	1.35	12 24.5	2.13	15.5
24	16 7.3	16 10.8	59 3.6	1.16	59 16.3	0.96	13 17.2	2.28	16.5
25	16 13.6	16 15.7	59 26.5	0.75	59 34.2	0.53	14 13.7	2.43	17.5
26	16 17.1	16 17.8	59 39.3	+0.32	59 41.9	+0.11	15 13.7	2.55	18.5
27	16 17.8	16 17.2	59 42.1	-0.08	59 40.0	-0.26	16 15.7	2.59	19.5
28	16 16.1	16 14.6	59 36.0	0.41	59 30.2	0.55	17 17.5	2.52	20.5
29	16 12.6	16 10.2	59 22.8	0.67	59 14.2	0.77	18 16.8	2.39	21.5
30	16 7.6	16 4.7	59 4.5	0.85	58 53.8	0.92	19 12.6	2.25	22.5
31	16 1.5	15 58.3	58 42.4	-0.98	58 30.3	-1.03	20 4.6	2.09	23.5

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
MONDAY 1.					WEDNESDAY 3.				
0	19 16 21.78	2.6022	S. 25° 3' 40.4"	1.978	0	21 17 49.97	2.4372	S. 20° 24' 51.6"	9.370
1	19 18 57.87	2.6008	25 1 36.6	2.148	1	21 20 15.44	2.4219	20 15 31.7	9.305
2	19 21 33.87	2.5993	24 59 22.6	2.318	2	21 22 40.59	2.4166	20 6 4.3	9.518
3	19 24 9.79	2.5978	24 56 58.4	2.488	3	21 25 5.42	2.4113	19 56 29.6	9.639
4	19 26 45.61	2.5963	24 54 24.1	2.657	4	21 27 29.94	2.4060	19 46 47.6	9.758
5	19 29 21.32	2.5944	24 51 39.7	2.825	5	21 29 54.14	2.4007	19 36 58.6	9.876
6	19 31 56.92	2.5924	24 48 45.1	2.994	6	21 32 18.01	2.3953	19 27 2.5	9.994
7	19 34 32.40	2.5903	24 45 40.5	3.160	7	21 34 41.57	2.3900	19 16 59.4	10.110
8	19 37 7.75	2.5882	24 42 25.9	3.326	8	21 37 4.81	2.3847	19 6 49.4	10.225
9	19 39 42.97	2.5851	24 39 1.3	3.493	9	21 39 27.73	2.3793	18 56 32.5	10.338
10	19 42 18.05	2.5835	24 35 26.7	3.660	10	21 41 50.33	2.3740	18 46 8.9	10.448
11	19 44 52.98	2.5810	24 31 42.2	3.825	11	21 44 12.60	2.3686	18 35 38.7	10.557
12	19 47 27.76	2.5784	24 27 47.8	3.990	12	21 46 34.55	2.3632	18 25 2.0	10.666
13	19 50 2.38	2.5757	24 23 43.5	4.153	13	21 48 56.18	2.3578	18 14 18.8	10.773
14	19 52 36.83	2.5728	24 19 29.4	4.315	14	21 51 17.49	2.3524	18 3 29.2	10.878
15	19 55 11.10	2.5698	24 15 5.6	4.478	15	21 53 38.47	2.3470	17 52 33.3	10.982
16	19 57 45.19	2.5667	24 10 32.1	4.639	16	21 55 59.13	2.3417	17 41 31.3	11.084
17	20 0 19.10	2.5635	24 5 48.9	4.801	17	21 58 19.47	2.3363	17 30 23.2	11.186
18	20 2 52.82	2.5603	24 0 56.0	4.961	18	22 0 39.49	2.3310	17 19 9.0	11.286
19	20 5 26.34	2.5570	23 55 53.6	5.119	19	22 2 59.19	2.3257	17 7 48.9	11.384
20	20 7 59.65	2.5535	23 50 41.7	5.278	20	22 5 18.57	2.3203	16 56 23.0	11.480
21	20 10 32.75	2.5500	23 45 20.2	5.436	21	22 7 37.63	2.3150	16 44 51.4	11.574
22	20 13 5.64	2.5463	23 39 49.3	5.592	22	22 9 56.37	2.3097	16 33 14.2	11.666
23	20 15 38.31	2.5426	S. 23 34 9.1	5.746	23	22 12 14.79	2.3044	S. 16 21 31.4	11.758
TUESDAY 2.					THURSDAY 4.				
0	20 18 10.75	2.5388	S. 23 28 19.7	5.900	0	22 14 32.90	2.2992	S. 16 9 43.1	11.848
1	20 20 42.96	2.5348	23 22 21.0	6.055	1	22 16 50.70	2.2940	15 57 49.5	11.937
2	20 23 14.93	2.5308	23 16 13.0	6.209	2	22 19 8.18	2.2887	15 45 50.6	12.024
3	20 25 46.65	2.5267	23 9 55.9	6.361	3	22 21 25.35	2.2835	15 33 46.5	12.110
4	20 28 18.13	2.5226	23 3 29.7	6.511	4	22 23 42.21	2.2783	15 21 37.3	12.194
5	20 30 49.36	2.5185	22 56 54.6	6.658	5	22 25 58.76	2.2732	15 9 23.1	12.276
6	20 33 20.34	2.5142	22 50 10.7	6.806	6	22 28 15.00	2.2682	14 57 4.0	12.358
7	20 35 51.06	2.5098	22 43 17.9	6.954	7	22 30 30.94	2.2631	14 44 40.1	12.438
8	20 38 21.51	2.5053	22 36 16.2	7.101	8	22 32 46.58	2.2580	14 32 11.5	12.516
9	20 40 51.69	2.5008	22 29 5.7	7.246	9	22 35 1.91	2.2530	14 19 38.2	12.592
10	20 43 21.60	2.4963	22 21 46.6	7.389	10	22 37 16.94	2.2480	14 7 0.4	12.667
11	20 45 51.24	2.4917	22 14 18.9	7.531	11	22 39 31.68	2.2431	13 54 18.2	12.740
12	20 48 20.60	2.4870	22 6 42.7	7.673	12	22 41 46.13	2.2382	13 41 31.6	12.812
13	20 50 49.68	2.4823	21 58 58.1	7.813	13	22 44 0.28	2.2333	13 28 40.8	12.882
14	20 53 18.47	2.4774	21 51 5.1	7.953	14	22 46 14.14	2.2285	13 15 45.8	12.952
15	20 55 46.96	2.4725	21 43 3.7	8.091	15	22 48 27.72	2.2238	13 2 46.6	13.020
16	20 58 15.16	2.4677	21 34 54.1	8.227	16	22 50 41.01	2.2192	12 49 43.4	13.085
17	21 0 43.07	2.4628	21 26 36.5	8.361	17	22 52 54.02	2.2145	12 36 36.4	13.149
18	21 3 10.69	2.4578	21 18 10.8	8.495	18	22 55 6.74	2.2098	12 23 25.6	13.211
19	21 5 38.00	2.4527	21 9 37.1	8.628	19	22 57 19.18	2.2052	12 10 11.1	13.273
20	21 8 5.01	2.4476	21 0 55.5	8.759	20	22 59 31.36	2.2007	11 56 52.9	13.333
21	21 10 31.71	2.4425	20 52 6.0	8.889	21	23 1 43.27	2.1962	11 43 31.2	13.391
22	21 12 58.10	2.4374	20 43 8.8	9.017	22	23 3 54.90	2.1917	11 30 6.0	13.448
23	21 15 24.19	2.4323	20 34 4.0	9.144	23	23 6 6.27	2.1872	11 16 37.5	13.503
24	21 17 49.97	2.4272	S. 20 24 51.6	9.270	24	23 8 17.37	2.1828	S. 11 3 5.7	13.556

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
FRIDAY 5.					SUNDAY 7.				
0	23 8 17.37	2.1828	S. 11° 3' 5.7"	13.556	0	0 49 6.55	2.0409	N. 0° 22' 10.1"	14.469
1	23 10 28.21	2.1785	10 49 30.8	13.609	1	0 51 8.96	2.0395	0 36 37.9	14.456
2	23 12 38.80	2.1743	10 35 52.7	13.660	2	0 53 11.29	2.0389	0 51 4.8	14.442
3	23 14 49.13	2.1700	10 22 11.6	13.709	3	0 55 13.54	2.0368	1 5 30.9	14.426
4	23 16 59.21	2.1650	10 8 27.6	13.756	4	0 57 15.71	2.0355	1 19 56.0	14.408
5	23 19 9.04	2.1618	9 54 40.8	13.802	5	0 59 17.80	2.0342	1 34 20.0	14.389
6	23 21 18.63	2.1578	9 40 51.3	13.847	6	1 1 19.82	2.0330	1 48 42.8	14.370
7	23 23 27.98	2.1538	9 26 59.2	13.891	7	1 3 21.77	2.0320	2 3 4.4	14.350
8	23 25 37.09	2.1498	9 13 4.5	13.934	8	1 5 23.66	2.0310	2 17 24.8	14.330
9	23 27 45.96	2.1459	8 59 7.2	13.975	9	1 7 25.49	2.0300	2 31 44.0	14.308
10	23 29 54.60	2.1420	8 45 7.5	14.013	10	1 9 27.26	2.0290	2 46 1.8	14.283
11	23 32 3.01	2.1383	8 31 5.6	14.048	11	1 11 28.98	2.0281	3 0 18.0	14.255
12	23 34 11.20	2.1347	8 17 1.6	14.085	12	1 13 30.64	2.0273	3 14 32.5	14.229
13	23 36 19.17	2.1310	8 2 55.4	14.120	13	1 15 32.26	2.0266	3 28 45.4	14.202
14	23 38 26.92	2.1273	7 48 47.2	14.154	14	1 17 33.84	2.0259	3 42 56.7	14.175
15	23 40 34.45	2.1237	7 34 37.0	14.186	15	1 19 35.37	2.0252	3 57 6.4	14.146
16	23 42 41.77	2.1202	7 20 24.9	14.216	16	1 21 36.86	2.0246	4 11 14.3	14.115
17	23 44 48.89	2.1168	7 6 11.1	14.244	17	1 23 38.32	2.0241	4 25 20.2	14.080
18	23 46 55.80	2.1135	6 51 55.6	14.279	18	1 25 39.76	2.0237	4 39 24.0	14.046
19	23 49 2.51	2.1102	6 37 38.5	14.298	19	1 27 41.17	2.0233	4 53 25.8	14.012
20	23 51 9.03	2.1070	6 23 19.9	14.323	20	1 29 42.56	2.0229	5 7 25.6	13.978
21	23 53 15.35	2.1038	6 8 59.8	14.346	21	1 31 43.92	2.0225	5 21 23.3	13.942
22	23 55 21.48	2.1007	5 54 38.4	14.368	22	1 33 45.26	2.0222	5 35 18.8	13.905
23	23 57 27.43	2.0977	S. 5 40 15.7	14.389	23	1 35 46.59	2.0221	N. 5 49 11.9	13.866
SATURDAY 6.					MONDAY 8.				
0	23 59 33.20	2.0947	S. 5 25 51.7	14.408	0	1 37 47.92	2.0220	N. 6 3 2.6	13.825
1	0 1 38.79	2.0917	5 11 26.6	14.426	1	1 39 49.24	2.0219	6 16 51.0	13.785
2	0 3 44.20	2.0887	4 57 0.6	14.441	2	1 41 50.55	2.0218	6 30 36.9	13.743
3	0 5 49.44	2.0858	4 42 33.6	14.457	3	1 43 51.86	2.0218	6 44 20.2	13.700
4	0 7 54.51	2.0831	4 28 5.8	14.470	4	1 45 53.17	2.0219	6 58 0.9	13.656
5	0 9 59.42	2.0805	4 13 37.2	14.484	5	1 47 54.49	2.0220	7 11 38.9	13.611
6	0 12 4.18	2.0780	3 59 7.8	14.495	6	1 49 55.81	2.0222	7 25 14.3	13.565
7	0 14 8.78	2.0755	3 44 37.8	14.504	7	1 51 57.15	2.0223	7 38 46.9	13.518
8	0 16 13.22	2.0730	3 30 7.3	14.512	8	1 53 58.50	2.0226	7 52 16.6	13.469
9	0 18 17.51	2.0705	3 15 36.4	14.519	9	1 55 59.87	2.0230	8 5 43.3	13.420
10	0 20 21.65	2.0680	3 1 5.1	14.525	10	1 58 1.26	2.0233	8 19 7.0	13.370
11	0 22 25.66	2.0656	2 46 33.5	14.530	11	2 0 2.67	2.0237	8 32 27.8	13.320
12	0 24 29.53	2.0633	2 32 1.6	14.534	12	2 2 4.11	2.0242	8 45 45.5	13.269
13	0 26 33.26	2.0611	2 17 29.5	14.536	13	2 4 5.58	2.0247	8 59 0.0	13.215
14	0 28 36.86	2.0590	2 2 57.5	14.536	14	2 6 7.08	2.0252	9 12 11.3	13.161
15	0 30 40.34	2.0569	1 48 25.5	14.534	15	2 8 8.60	2.0257	9 25 19.3	13.106
16	0 32 43.69	2.0548	1 33 53.5	14.531	16	2 10 10.16	2.0263	9 38 24.0	13.049
17	0 34 46.93	2.0529	1 19 21.7	14.528	17	2 12 11.77	2.0271	9 51 25.3	12.991
18	0 36 50.05	2.0510	1 4 50.1	14.523	18	2 14 13.43	2.0279	10 4 23.1	12.933
19	0 38 53.05	2.0492	0 50 18.9	14.517	19	2 16 15.13	2.0286	10 17 17.4	12.875
20	0 40 55.95	2.0475	0 35 48.1	14.510	20	2 18 16.87	2.0294	10 30 8.1	12.816
21	0 42 58.75	2.0458	0 21 17.6	14.504	21	2 20 18.66	2.0302	10 42 55.3	12.756
22	0 45 1.45	2.0441	S. 0 6 47.6	14.494	22	2 22 20.50	2.0311	10 55 38.8	12.694
23	0 47 4.05	2.0425	N. 0 7 41.6	14.482	23	2 24 22.40	2.0321	11 8 18.5	12.631
24	0 49 6.55	2.0409	N. 0 22 10.1	14.469	24	2 26 24.36	2.0330	N. 11 20 54.5	12.567

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
TUESDAY 9.					THURSDAY 11.				
0	2 26 24.36	2.0330	N.11° 20' 54.5"	12.567	0	4 5 41.54	2.1114	N.19° 54' 46.5"	8.550
1	2 28 26.37	2.0340	11 33 26.6	12.502	1	4 7 48.28	2.1133	20 3 16.5	8.449
2	2 30 28.45	2.0351	11 45 54.8	12.435	2	4 9 55.14	2.1153	20 11 40.4	8.348
3	2 32 30.59	2.0362	11 58 19.0	12.369	3	4 12 2.12	2.1173	20 19 58.2	8.246
4	2 34 32.80	2.0373	12 10 39.2	12.303	4	4 14 9.21	2.1192	20 28 9.9	8.143
5	2 36 35.08	2.0385	12 22 55.4	12.235	5	4 16 16.41	2.1210	20 36 15.4	8.039
6	2 38 37.43	2.0397	12 35 7.5	12.167	6	4 18 23.73	2.1229	20 44 14.6	7.935
7	2 40 39.85	2.0410	12 47 15.4	12.097	7	4 20 31.16	2.1248	20 52 7.6	7.831
8	2 42 42.35	2.0422	12 59 19.1	12.025	8	4 22 38.71	2.1267	20 59 54.3	7.726
9	2 44 44.92	2.0435	13 11 18.5	11.954	9	4 24 46.37	2.1286	21 7 34.7	7.621
10	2 46 47.57	2.0448	13 23 13.6	11.881	10	4 26 54.14	2.1305	21 15 8.8	7.515
11	2 48 50.31	2.0462	13 35 4.3	11.807	11	4 29 2.02	2.1323	21 22 36.5	7.409
12	2 50 53.13	2.0476	13 46 50.5	11.733	12	4 31 10.01	2.1342	21 29 57.8	7.302
13	2 52 56.03	2.0490	13 58 32.2	11.658	13	4 33 18.11	2.1360	21 37 12.7	7.194
14	2 54 59.02	2.0504	14 10 9.5	11.583	14	4 35 26.32	2.1378	21 44 21.1	7.085
15	2 57 2.09	2.0519	14 21 42.2	11.507	15	4 37 34.64	2.1396	21 51 22.9	6.976
16	2 59 5.25	2.0535	14 33 10.3	11.428	16	4 39 43.07	2.1413	21 58 18.2	6.867
17	3 1 8.51	2.0551	14 44 33.6	11.348	17	4 41 51.60	2.1430	22 5 7.0	6.758
18	3 3 11.87	2.0567	14 55 52.2	11.270	18	4 44 0.23	2.1447	22 11 49.2	6.648
19	3 5 15.32	2.0582	15 7 6.0	11.190	19	4 46 8.97	2.1465	22 18 24.8	6.538
20	3 7 18.86	2.0598	15 18 15.0	11.110	20	4 48 17.81	2.1482	22 24 53.7	6.427
21	3 9 22.50	2.0615	15 29 19.2	11.028	21	4 50 26.75	2.1498	22 31 16.0	6.316
22	3 11 26.24	2.0632	15 40 18.5	10.946	22	4 52 35.79	2.1515	22 37 31.6	6.204
23	3 13 30.08	2.0648	N.15 51 12.8	10.862	23	4 54 44.93	2.1532	N.22 43 40.5	6.092
WEDNESDAY 10.					FRIDAY 12.				
0	3 15 34.02	2.0665	N.16 2 2.0	10.777	0	4 56 54.17	2.1548	N.22 49 42.6	5.979
1	3 17 38.06	2.0682	16 12 46.1	10.693	1	4 59 3.50	2.1564	22 55 38.0	5.866
2	3 19 42.21	2.0700	16 23 25.2	10.609	2	5 1 12.92	2.1579	23 1 26.6	5.752
3	3 21 46.47	2.0718	16 33 59.2	10.523	3	5 3 22.44	2.1594	23 7 8.3	5.638
4	3 23 50.83	2.0735	16 44 28.0	10.436	4	5 5 32.05	2.1609	23 12 43.2	5.524
5	3 25 55.30	2.0753	16 54 51.5	10.348	5	5 7 41.75	2.1623	23 18 11.3	5.410
6	3 27 59.87	2.0771	17 5 9.7	10.259	6	5 9 51.53	2.1637	23 23 32.5	5.295
7	3 30 4.55	2.0789	17 15 22.6	10.170	7	5 12 1.39	2.1657	23 28 46.8	5.180
8	3 32 9.35	2.0808	17 25 30.1	10.080	8	5 14 11.34	2.1665	23 33 54.1	5.065
9	3 34 14.26	2.0827	17 35 32.2	9.990	9	5 16 21.37	2.1678	23 38 54.5	4.949
10	3 36 19.28	2.0845	17 45 28.9	9.899	10	5 18 31.48	2.1692	23 43 48.0	4.833
11	3 38 24.41	2.0864	17 55 20.1	9.806	11	5 20 41.67	2.1705	23 48 34.5	4.716
12	3 40 29.65	2.0883	18 5 5.7	9.713	12	5 22 51.93	2.1717	23 53 13.9	4.599
13	3 42 35.01	2.0902	18 14 45.7	9.620	13	5 25 2.26	2.1728	23 57 46.3	4.482
14	3 44 40.48	2.0922	18 24 20.1	9.526	14	5 27 12.66	2.1740	24 2 11.7	4.366
15	3 46 46.07	2.0941	18 33 48.9	9.432	15	5 29 23.14	2.1751	24 6 30.2	4.249
16	3 48 51.77	2.0960	18 43 12.0	9.337	16	5 31 33.68	2.1762	24 10 41.6	4.130
17	3 50 57.60	2.0979	18 52 29.3	9.240	17	5 33 44.28	2.1773	24 14 45.8	4.011
18	3 53 3.52	2.0998	19 1 40.8	9.143	18	5 35 54.95	2.1783	24 18 42.8	3.892
19	3 55 9.57	2.1017	19 10 46.5	9.046	19	5 38 5.68	2.1793	24 22 32.7	3.773
20	3 57 15.73	2.1037	19 19 46.4	8.948	20	5 40 16.46	2.1803	24 26 15.6	3.654
21	3 59 22.01	2.1057	19 28 40.4	8.850	21	5 42 27.30	2.1812	24 29 51.4	3.535
22	4 1 28.40	2.1076	19 37 28.4	8.750	22	5 44 38.19	2.1820	24 33 20.0	3.416
23	4 3 34.91	2.1095	19 46 10.4	8.650	23	5 46 49.13	2.1829	24 36 41.4	3.297
24	4 5 41.54	2.1114	N.19 54 46.5	8.550	24	5 49 0.12	2.1835	N.24 39 55.6	3.177

## GREENWICH MEAN TIME

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SATURDAY 13.					MONDAY 15.				
0	5 49 0.12	2.1835	N.24 39' 55.6"	3.177	0	7 33 49.77	2.1668	N.24 53' 18.0"	2.600
1	5 51 11.15	2.1842	24 43 2.6	3.057	1	7 35 59.73	2.1654	24 50 38.5	2.717
2	5 53 22.22	2.1850	24 46 2.4	2.937	2	7 38 9.61	2.1639	24 47 51.9	2.835
3	5 55 33.34	2.1857	24 48 55.1	2.818	3	7 40 19.40	2.1624	24 44 58.3	2.952
4	5 57 44.50	2.1863	24 51 40.6	2.698	4	7 42 29.10	2.1608	24 41 57.7	3.068
5	5 59 55.69	2.1868	24 54 18.8	2.576	5	7 44 38.70	2.1592	24 38 50.1	3.184
6	6 2 6.90	2.1873	24 56 49.7	2.455	6	7 46 48.21	2.1576	24 35 35.6	3.300
7	6 4 18.14	2.1877	24 59 13.4	2.334	7	7 48 57.63	2.1560	24 32 14.1	3.416
8	6 6 29.41	2.1881	25 1 29.9	2.213	8	7 51 6.95	2.1544	24 28 45.7	3.531
9	6 8 40.71	2.1885	25 3 39.1	2.093	9	7 53 16.16	2.1527	24 25 10.4	3.646
10	6 10 52.03	2.1888	25 5 41.1	1.973	10	7 55 25.27	2.1510	24 21 28.2	3.760
11	6 13 3.36	2.1890	25 7 35.8	1.851	11	7 57 34.28	2.1493	24 17 39.2	3.874
12	6 15 14.71	2.1893	25 9 23.2	1.729	12	7 59 43.18	2.1475	24 13 43.3	3.989
13	6 17 26.07	2.1895	25 11 3.3	1.608	13	8 1 51.97	2.1457	24 9 40.5	4.103
14	6 19 37.44	2.1896	25 12 36.2	1.487	14	8 4 6.65	2.1438	24 5 31.0	4.216
15	6 21 48.82	2.1897	25 14 1.8	1.366	15	8 6 9.23	2.1419	24 1 14.7	4.329
16	6 24 0.20	2.1897	25 15 20.1	1.244	16	8 8 17.69	2.1400	23 56 51.6	4.441
17	6 26 11.58	2.1897	25 16 31.1	1.123	17	8 10 26.03	2.1381	23 52 21.8	4.553
18	6 28 22.96	2.1897	25 17 34.9	1.003	18	8 12 34.26	2.1362	23 47 45.2	4.665
19	6 30 34.34	2.1897	25 18 31.4	0.881	19	8 14 42.37	2.1343	23 43 1.9	4.777
20	6 32 45.71	2.1895	25 19 20.6	0.759	20	8 16 50.36	2.1323	23 38 12.0	4.887
21	6 34 57.07	2.1893	25 20 2.5	0.637	21	8 18 58.23	2.1302	23 33 15.5	4.997
22	6 37 8.42	2.1890	25 20 37.1	0.516	22	8 21 5.98	2.1282	23 28 12.3	5.108
23	6 39 19.75	2.1887	N.25 21 4.4	0.395	23	8 23 13.61	2.1262	N.23 23 2.5	5.218
SUNDAY 14.					TUESDAY 16.				
0	6 41 31.06	2.1883	N.25 21 24.5	0.274	0	8 25 21.11	2.1241	N.23 17 46.0	5.328
1	6 43 42.35	2.1880	25 21 37.3	0.153	1	8 27 28.49	2.1220	23 12 23.0	5.437
2	6 45 53.62	2.1877	25 21 42.8	+0.031	2	8 29 35.74	2.1198	23 6 53.5	5.545
3	6 48 4.86	2.1872	25 21 41.0	-0.090	3	8 31 42.86	2.1177	23 1 17.6	5.652
4	6 50 16.07	2.1866	25 21 32.0	0.210	4	8 33 49.86	2.1156	22 55 35.2	5.760
5	6 52 27.24	2.1860	25 21 15.7	0.331	5	8 35 56.73	2.1135	22 49 46.4	5.868
6	6 54 38.38	2.1854	25 20 52.2	0.453	6	8 38 3.47	2.1114	22 43 51.0	5.975
7	6 56 49.48	2.1847	25 20 21.4	0.573	7	8 40 10.08	2.1092	22 37 49.3	6.081
8	6 59 0.54	2.1840	25 19 43.4	0.694	8	8 42 16.56	2.1069	22 31 41.2	6.187
9	7 1 11.66	2.1833	25 18 58.1	0.815	9	8 44 22.90	2.1047	22 25 26.8	6.293
10	7 3 22.53	2.1825	25 18 5.6	0.935	10	8 46 29.11	2.1025	22 19 6.1	6.398
11	7 5 33.45	2.1817	25 17 5.9	1.055	11	8 48 35.19	2.1003	22 12 39.1	6.503
12	7 7 44.32	2.1808	25 15 59.0	1.175	12	8 50 41.14	2.0981	22 6 5.7	6.608
13	7 9 55.13	2.1798	25 14 44.9	1.295	13	8 52 46.96	2.0958	21 59 26.1	6.711
14	7 12 5.89	2.1788	25 13 23.6	1.415	14	8 54 52.64	2.0935	21 52 40.4	6.813
15	7 14 16.59	2.1778	25 11 55.1	1.535	15	8 56 58.17	2.0912	21 45 48.6	6.915
16	7 16 27.22	2.1767	25 10 19.5	1.653	16	8 59 3.57	2.0890	21 38 50.6	7.017
17	7 18 37.79	2.1757	25 8 36.7	1.772	17	9 1 8.84	2.0868	21 31 46.5	7.119
18	7 20 48.30	2.1746	25 6 46.8	1.892	18	9 3 13.99	2.0846	21 24 36.3	7.221
19	7 22 58.74	2.1733	25 4 49.8	2.010	19	9 5 19.00	2.0823	21 17 20.0	7.322
20	7 25 9.10	2.1720	25 2 45.6	2.128	20	9 7 23.87	2.0800	21 9 57.7	7.421
21	7 27 19.38	2.1707	25 0 34.3	2.247	21	9 9 28.59	2.0777	21 2 29.5	7.520
22	7 29 29.59	2.1695	24 58 15.9	2.365	22	9 11 33.18	2.0755	20 54 55.3	7.619
23	7 31 39.72	2.1682	24 55 50.5	2.483	23	9 13 37.64	2.0732	20 47 15.2	7.717
24	7 33 49.77	2.1668	N.24 53 18.0	2.600	24	9 15 41.98	2.0711	N.20 39 29.2	7.816

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
WEDNESDAY 17.					FRIDAY 19.				
0	9 <sup>h</sup> 15 <sup>m</sup> 41.98	2.0711	N.20° 39' 29.2"	7.816	0	10 <sup>h</sup> 52 <sup>m</sup> 49.00	1.9855	N.12° 42' 21.9"	11.886
1	9 17 46.18	2.0688	20 31 37.3	7.914	1	10 54 48.10	1.9845	12 30 30.3	11.894
2	9 19 50.24	2.0665	20 23 39.6	8.010	2	10 56 47.14	1.9835	12 18 34.7	11.960
3	9 21 54.16	2.0642	20 15 36.1	8.106	3	10 58 46.12	1.9826	12 6 35.1	12.026
4	9 23 57.95	2.0620	20 7 26.8	8.202	4	11 0 45.05	1.9818	11 54 31.6	12.091
5	9 26 1.61	2.0598	19 59 11.8	8.298	5	11 2 43.93	1.9810	11 42 24.2	12.156
6	9 28 5.14	2.0577	19 50 51.1	8.393	6	11 4 42.76	1.9802	11 30 12.9	12.220
7	9 30 8.54	2.0555	19 42 24.7	8.487	7	11 6 41.55	1.9795	11 17 57.8	12.283
8	9 32 11.80	2.0533	19 33 52.7	8.581	8	11 8 40.30	1.9788	11 5 38.9	12.346
9	9 34 14.93	2.0511	19 25 15.0	8.674	9	11 10 39.01	1.9780	10 53 16.3	12.408
10	9 36 17.93	2.0490	19 16 31.8	8.766	10	11 12 37.68	1.9776	10 40 50.0	12.468
11	9 38 20.81	2.0468	19 7 43.1	8.858	11	11 14 36.32	1.9771	10 28 20.1	12.528
12	9 40 23.56	2.0447	18 58 48.9	8.949	12	11 16 34.93	1.9766	10 15 46.7	12.587
13	9 42 26.18	2.0426	18 49 49.2	9.040	13	11 18 33.51	1.9762	10 3 9.7	12.646
14	9 44 28.68	2.0405	18 40 44.1	9.130	14	11 20 32.07	1.9758	9 50 29.2	12.704
15	9 46 31.05	2.0384	18 31 33.6	9.220	15	11 22 30.61	1.9755	9 37 45.2	12.761
16	9 48 33.30	2.0363	18 22 17.7	9.309	16	11 24 29.13	1.9752	9 24 57.8	12.817
17	9 50 35.42	2.0343	18 12 56.5	9.396	17	11 26 27.64	1.9750	9 12 7.2	12.871
18	9 52 37.42	2.0323	18 3 30.1	9.484	18	11 28 26.13	1.9748	8 59 13.3	12.925
19	9 54 39.30	2.0303	17 53 58.4	9.572	19	11 30 24.62	1.9747	8 46 16.1	12.979
20	9 56 41.06	2.0283	17 44 21.5	9.659	20	11 32 23.10	1.9746	8 33 15.7	13.032
21	9 58 42.71	2.0264	17 34 39.3	9.745	21	11 34 21.57	1.9745	8 20 12.2	13.084
22	10 0 44.24	2.0245	17 24 52.0	9.830	22	11 36 20.05	1.9746	8 7 5.6	13.136
23	10 2 45.66	2.0226	N.17 14 59.6	9.915	23	11 38 18.53	1.9747	N. 7 53 55.9	13.187
THURSDAY 18.					SATURDAY 20.				
0	10 4 46.96	2.0207	N.17 5 2.2	9.999	0	11 40 17.02	1.9749	N. 7 40 43.2	13.236
1	10 6 48.15	2.0188	16 54 59.7	10.083	1	11 42 15.52	1.9751	7 27 27.6	13.284
2	10 8 49.23	2.0170	16 44 52.2	10.166	2	11 44 14.04	1.9753	7 14 9.1	13.339
3	10 10 50.20	2.0152	16 34 39.8	10.248	3	11 46 12.57	1.9757	7 0 47.7	13.379
4	10 12 51.06	2.0135	16 24 22.4	10.331	4	11 48 11.13	1.9761	6 47 23.6	13.425
5	10 14 51.82	2.0118	16 14 0.2	10.412	5	11 50 9.71	1.9765	6 33 56.8	13.470
6	10 16 52.48	2.0101	16 3 33.1	10.492	6	11 52 8.32	1.9770	6 20 27.2	13.515
7	10 18 53.04	2.0084	15 53 1.2	10.572	7	11 54 6.96	1.9776	6 6 55.0	13.558
8	10 20 53.50	2.0067	15 42 24.6	10.650	8	11 56 5.64	1.9782	5 53 20.3	13.600
9	10 22 53.85	2.0050	15 31 43.2	10.729	9	11 58 4.35	1.9788	5 39 43.0	13.642
10	10 24 54.11	2.0035	15 20 57.1	10.807	10	12 0 3.10	1.9796	5 26 3.3	13.682
11	10 26 54.28	2.0020	15 10 6.4	10.884	11	12 2 1.90	1.9805	5 12 21.2	13.722
12	10 28 54.37	2.0006	14 59 11.0	10.961	12	12 4 0.76	1.9814	4 58 36.7	13.761
13	10 30 54.37	1.9991	14 48 11.1	11.037	13	12 5 59.67	1.9823	4 44 49.9	13.799
14	10 32 54.27	1.9976	14 37 6.7	11.112	14	12 7 58.63	1.9832	4 31 0.9	13.835
15	10 34 54.08	1.9962	14 25 57.7	11.187	15	12 9 57.65	1.9842	4 17 9.7	13.871
16	10 36 53.81	1.9949	14 14 44.2	11.261	16	12 11 56.73	1.9854	4 3 16.4	13.906
17	10 38 53.47	1.9936	14 3 26.4	11.333	17	12 13 55.89	1.9866	3 49 21.0	13.940
18	10 40 53.05	1.9923	13 52 4.3	11.405	18	12 15 55.12	1.9878	3 35 23.6	13.973
19	10 42 52.55	1.9910	13 40 37.8	11.477	19	12 17 54.42	1.9890	3 21 24.3	14.005
20	10 44 51.98	1.9898	13 29 7.0	11.548	20	12 19 53.80	1.9903	3 7 23.1	14.036
21	10 46 51.33	1.9886	13 17 32.0	11.618	21	12 21 53.26	1.9917	2 53 20.0	14.066
22	10 48 50.61	1.9875	13 5 52.8	11.688	22	12 23 52.81	1.9932	2 39 15.2	14.094
23	10 50 49.83	1.9865	12 54 9.4	11.757	23	12 25 52.45	1.9947	2 25 8.7	14.122
24	10 52 49.00	1.9855	N.12 42 21.9	11.826	24	12 27 52.18	1.9963	N. 2 11 0.6	14.149

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SUNDAY 21.					TUESDAY 23.				
0	12 27 52.18	1.9963	N. 2 11' 0.6"	14.149	0	14 6 46.65	2.1496	S. 9 16' 47.9"	14.014
1	12 29 52.01	1.9981	1 56 50.9	14.175	1	14 8 55.77	2.1544	9 30 47.6	13.977
2	12 31 51.95	1.9998	1 42 39.7	14.200	2	14 11 5.18	2.1592	9 44 45.1	13.939
3	12 33 51.99	2.0016	1 28 27.0	14.223	3	14 13 14.88	2.1641	9 58 40.3	13.899
4	12 35 52.14	2.0034	1 14 13.0	14.245	4	14 15 24.87	2.1690	10 12 33.1	13.858
5	12 37 52.40	2.0053	0 59 57.7	14.267	5	14 17 35.16	2.1740	10 26 23.3	13.815
6	12 39 52.77	2.0073	0 45 41.0	14.288	6	14 19 45.75	2.1790	10 40 10.9	13.771
7	12 41 53.27	2.0094	0 31 23.1	14.307	7	14 21 56.64	2.1841	10 53 55.8	13.725
8	12 43 53.90	2.0115	0 17 4.2	14.324	8	14 24 7.84	2.1892	11 7 37.9	13.677
9	12 45 54.65	2.0136	N. 0 2 44.3	14.349	9	14 26 19.34	2.1943	11 21 17.1	13.628
10	12 47 55.53	2.0159	S. 0 11 36.6	14.356	10	14 28 31.15	2.1995	11 34 53.3	13.577
11	12 49 56.56	2.0183	0 25 58.5	14.372	11	14 30 43.28	2.2048	11 48 26.4	13.525
12	12 51 57.73	2.0206	0 40 21.3	14.386	12	14 32 55.73	2.2101	12 1 56.3	13.471
13	12 53 59.04	2.0230	0 54 44.8	14.398	13	14 35 8.50	2.2155	12 15 22.9	13.416
14	12 56 0.50	2.0255	1 9 9.0	14.408	14	14 37 21.59	2.2209	12 28 46.2	13.358
15	12 58 2.11	2.0281	1 23 33.8	14.418	15	14 39 35.01	2.2264	12 42 6.0	13.299
16	13 0 3.88	2.0308	1 37 59.2	14.427	16	14 41 48.76	2.2318	12 55 22.1	13.238
17	13 2 5.81	2.0335	1 52 25.1	14.435	17	14 44 2.84	2.2373	13 8 34.6	13.176
18	13 4 7.90	2.0363	2 6 51.4	14.441	18	14 46 17.24	2.2428	13 21 43.3	13.112
19	13 6 10.16	2.0392	2 21 18.0	14.446	19	14 48 31.98	2.2485	13 34 48.1	13.047
20	13 8 12.59	2.0421	2 35 44.9	14.451	20	14 50 47.06	2.2542	13 47 48.9	12.980
21	13 10 15.20	2.0450	2 50 12.1	14.454	21	14 53 2.49	2.2600	14 0 45.7	12.919
22	13 12 17.99	2.0481	3 4 39.4	14.455	22	14 55 18.26	2.2657	14 13 38.3	12.840
23	13 14 20.97	2.0512	S. 3 19 6.6	14.454	23	14 57 34.37	2.2714	S. 14 26 26.5	12.767
MONDAY 22.					WEDNESDAY 24.				
0	13 16 24.13	2.0543	S. 3 33 33.8	14.459	0	14 59 50.83	2.2779	S. 14 39 10.3	12.693
1	13 18 27.48	2.0575	3 48 0.9	14.450	1	15 2 7.64	2.2831	14 51 49.7	12.618
2	13 20 31.03	2.0609	4 2 27.8	14.446	2	15 4 24.80	2.2889	15 4 24.5	12.541
3	13 22 34.79	2.0643	4 16 54.5	14.441	3	15 6 42.31	2.2947	15 16 54.6	12.462
4	13 24 38.75	2.0677	4 31 20.8	14.435	4	15 9 0.17	2.3007	15 29 19.9	12.381
5	13 26 42.92	2.0711	4 45 46.7	14.428	5	15 11 18.39	2.3067	15 41 40.3	12.298
6	13 28 47.29	2.0747	5 0 12.2	14.420	6	15 13 36.97	2.3127	15 53 55.6	12.213
7	13 30 51.88	2.0783	5 14 37.1	14.409	7	15 15 55.91	2.3187	16 6 5.8	12.128
8	13 32 56.69	2.0821	5 29 1.2	14.396	8	15 18 15.21	2.3247	16 18 10.9	12.041
9	13 35 1.73	2.0858	5 43 24.6	14.383	9	15 20 34.86	2.3307	16 30 10.7	11.952
10	13 37 6.99	2.0896	5 57 47.2	14.369	10	15 22 54.87	2.3367	16 42 5.1	11.860
11	13 39 12.48	2.0935	6 12 8.8	14.353	11	15 25 15.25	2.3427	16 53 53.9	11.766
12	13 41 18.21	2.0975	6 26 29.4	14.335	12	15 27 36.00	2.3488	17 5 37.0	11.673
13	13 43 24.18	2.1015	6 40 49.0	14.317	13	15 29 57.11	2.3548	17 17 14.4	11.576
14	13 45 30.39	2.1055	6 55 7.4	14.297	14	15 32 18.58	2.3608	17 28 46.1	11.478
15	13 47 36.84	2.1096	7 9 24.6	14.275	15	15 34 40.41	2.3669	17 40 11.8	11.378
16	13 49 43.55	2.1139	7 23 40.4	14.251	16	15 37 2.61	2.3731	17 51 31.5	11.277
17	13 51 50.51	2.1182	7 37 54.7	14.226	17	15 39 25.18	2.3792	18 2 45.0	11.175
18	13 53 57.73	2.1225	7 52 7.6	14.201	18	15 41 48.11	2.3852	18 13 52.4	11.070
19	13 56 5.21	2.1268	8 6 18.9	14.174	19	15 44 11.40	2.3912	18 24 53.4	10.963
20	13 58 12.95	2.1313	8 20 28.4	14.144	20	15 46 35.06	2.3973	18 35 47.9	10.854
21	14 0 20.97	2.1358	8 34 36.2	14.114	21	15 48 59.08	2.4033	18 46 35.9	10.744
22	14 2 29.26	2.1404	8 48 42.1	14.089	22	15 51 23.46	2.4094	18 57 17.2	10.633
23	14 4 37.82	2.1450	9 2 46.0	14.049	23	15 53 48.21	2.4155	19 7 51.8	10.520
24	14 6 46.65	2.1496	S. 9 16 47.9	14.014	24	15 56 13.32	2.4215	S. 19 18 19.6	10.405



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
THURSDAY 25.					SATURDAY 27.				
0	15 56 13.32	2.4215	S. 19° 18' 19.6"	10.405	0	17 58 25.17	2.6377	S. 24° 57' 0.6"	3.998
1	15 58 38.79	2.4275	19 28 40.4	10.388	1	18 1 3.50	2.6307	25 0 9.0	3.053
2	16 1 4.62	2.4334	19 38 54.1	10.171	2	18 3 41.93	2.6415	25 3 6.9	2.879
3	16 3 30.80	2.4393	19 49 0.8	10.052	3	18 6 20.46	2.6431	25 5 54.4	2.704
4	16 5 57.34	2.4453	19 59 0.3	9.931	4	18 8 59.08	2.6445	25 8 31.3	2.527
5	16 8 24.24	2.4512	20 8 52.4	9.807	5	18 11 37.80	2.6459	25 10 57.6	2.350
6	16 10 51.49	2.4571	20 18 36.9	9.681	6	18 14 16.60	2.6473	25 13 13.3	2.173
7	16 13 19.09	2.4629	20 28 13.9	9.554	7	18 16 55.47	2.6483	25 15 18.4	1.996
8	16 15 47.04	2.4687	20 37 43.4	9.427	8	18 19 34.39	2.6492	25 17 12.8	1.818
9	16 18 15.33	2.4744	20 47 5.2	9.308	9	18 22 13.36	2.6499	25 18 56.6	1.641
10	16 20 43.97	2.4802	20 56 19.2	9.187	10	18 24 52.37	2.6505	25 20 29.7	1.463
11	16 23 12.95	2.4859	21 5 25.2	9.034	11	18 27 31.42	2.6510	25 21 52.2	1.285
12	16 25 42.27	2.4915	21 14 23.2	8.899	12	18 30 10.50	2.6514	25 23 4.0	1.107
13	16 28 11.92	2.4970	21 23 13.0	8.764	13	18 32 49.59	2.6516	25 24 5.1	0.998
14	16 30 41.90	2.5025	21 31 54.7	8.628	14	18 35 28.69	2.6516	25 24 55.4	0.749
15	16 33 12.22	2.5080	21 40 28.3	8.490	15	18 38 7.78	2.6514	25 25 35.0	0.571
16	16 35 42.86	2.5134	21 48 53.5	8.350	16	18 40 46.86	2.6519	25 26 4.0	0.393
17	16 38 13.82	2.5187	21 57 10.2	8.208	17	18 43 25.93	2.6509	25 26 22.3	0.215
18	16 40 45.10	2.5239	22 5 18.2	8.064	18	18 46 4.97	2.6504	25 26 29.8	-0.037
19	16 43 16.69	2.5291	22 13 17.6	7.919	19	18 48 43.97	2.6406	25 26 26.6	+0.142
20	16 45 48.59	2.5343	22 21 8.4	7.774	20	18 51 22.92	2.6487	25 26 12.8	0.390
21	16 48 20.80	2.5394	22 28 50.5	7.627	21	18 54 1.81	2.6477	25 25 48.3	0.497
22	16 50 53.31	2.5443	22 36 23.7	7.478	22	18 56 40.64	2.6468	25 25 13.1	0.675
23	16 53 26.11	2.5491	S. 22° 43' 47.9"	7.328	23	18 59 19.40	2.6454	S. 25° 24' 27.3"	0.851
FRIDAY 26.					SUNDAY 28.				
0	16 55 59.20	2.5539	S. 22° 51' 3.1"	7.177	0	19 1 58.08	2.6440	S. 25° 23' 30.9"	1.098
1	16 58 32.58	2.5587	22 58 9.2	7.085	1	19 4 36.66	2.6424	25 22 23.9	1.385
2	17 1 6.24	2.5633	23 5 6.1	6.871	2	19 7 15.15	2.6406	25 21 6.2	1.383
3	17 3 40.17	2.5678	23 11 53.7	6.716	3	19 9 53.53	2.6387	25 19 37.9	1.560
4	17 6 14.37	2.5723	23 18 32.0	6.500	4	19 12 31.79	2.6367	25 17 59.1	1.735
5	17 8 48.84	2.5767	23 25 0.9	6.402	5	19 15 9.93	2.6347	25 16 9.9	1.908
6	17 11 23.57	2.5809	23 31 20.3	6.343	6	19 17 47.95	2.6325	25 14 10.2	2.082
7	17 13 58.55	2.5850	23 37 30.1	6.083	7	19 20 25.83	2.6300	25 12 0.0	2.256
8	17 16 33.77	2.5890	23 43 30.3	5.994	8	19 23 3.55	2.6273	25 9 39.4	2.430
9	17 19 9.23	2.5929	23 49 21.0	5.784	9	19 25 41.10	2.6245	25 7 8.4	2.603
10	17 21 44.92	2.5967	23 55 2.0	5.601	10	19 28 18.49	2.6217	25 4 27.1	2.774
11	17 24 20.84	2.6005	24 0 33.1	5.436	11	19 30 55.72	2.6189	25 1 35.5	2.945
12	17 26 56.98	2.6041	24 5 54.2	5.360	12	19 33 32.77	2.6159	24 58 33.7	3.116
13	17 29 33.33	2.6076	24 11 5.4	5.104	13	19 36 9.63	2.6127	24 55 21.6	3.287
14	17 32 9.89	2.6110	24 16 6.7	4.939	14	19 38 46.29	2.6094	24 51 59.3	3.456
15	17 34 46.65	2.6142	24 20 58.1	4.773	15	19 41 22.75	2.6059	24 48 26.9	3.624
16	17 37 23.60	2.6174	24 25 39.4	4.603	16	19 43 58.99	2.6024	24 44 44.5	3.791
17	17 40 0.73	2.6204	24 30 10.5	4.433	17	19 46 35.03	2.5988	24 40 52.1	3.958
18	17 42 38.05	2.6233	24 34 31.3	4.263	18	19 49 10.85	2.5951	24 36 49.6	4.124
19	17 45 15.54	2.6261	24 38 41.9	4.093	19	19 51 46.44	2.5912	24 32 37.2	4.289
20	17 47 53.18	2.6287	24 42 42.3	3.922	20	19 54 21.79	2.5871	24 28 15.0	4.452
21	17 50 30.97	2.6311	24 46 32.5	3.750	21	19 56 56.89	2.5829	24 23 43.0	4.614
22	17 53 8.90	2.6334	24 50 12.3	3.578	22	19 59 31.74	2.5787	24 19 1.3	4.776
23	17 55 46.96	2.6356	24 53 41.7	3.402	23	20 2 6.34	2.5745	24 14 9.9	4.937
24	17 58 25.17	2.6377	S. 24° 57' 0.6"	3.228	24	20 4 40.68	2.5701	S. 24° 9' 8.8"	5.098

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
MONDAY 29.					TUESDAY 30.				
0	<sup>h</sup> 20 <sup>m</sup> 4 <sup>s</sup> 40.68	2.5701	S. 24° 9' 8.8"	5.098	0	<sup>h</sup> 21 <sup>m</sup> 4 <sup>s</sup> 53.78	2.4422	S. 21° 23' 39.1"	8.568
1	20 7 14.75	2.5656	24 3 58.1	5.957	1	21 7 20.14	2.4363	21 15 1.2	8.697
2	20 9 48.55	2.5610	23 58 38.0	5.415	2	21 9 46.14	2.4303	21 6 15.5	8.894
3	20 12 22.07	2.5563	23 53 8.4	5.572	3	21 12 11.77	2.4242	20 57 22.3	8.949
4	20 14 55.30	2.5515	23 47 29.4	5.797	4	21 14 37.04	2.4182	20 48 21.6	9.072
5	20 17 28.24	2.5467	23 41 41.2	5.880	5	21 17 1.95	2.4123	20 39 13.6	9.193
6	20 20 0.90	2.5418	23 35 43.9	6.032	6	21 19 26.51	2.4063	20 29 58.4	9.313
7	20 22 33.26	2.5368	23 29 37.4	6.185	7	21 21 50.70	2.4002	20 20 36.0	9.432
8	20 25 5.31	2.5316	23 23 21.7	6.337	8	21 24 14.53	2.3942	20 11 6.4	9.550
9	20 27 37.05	2.5264	23 16 57.0	6.486	9	21 26 37.99	2.3881	20 1 29.8	9.667
10	20 30 8.48	2.5212	23 10 23.4	6.634	10	21 29 1.09	2.3820	19 51 46.3	9.782
11	20 32 39.59	2.5159	23 3 41.0	6.781	11	21 31 23.82	2.3759	19 41 56.0	9.895
12	20 35 10.39	2.5105	22 56 49.7	6.927	12	21 33 46.19	2.3698	19 31 58.9	10.006
13	20 37 40.86	2.5051	22 49 49.7	7.071	13	21 36 8.20	2.3638	19 21 55.2	10.116
14	20 40 11.00	2.4996	22 42 41.2	7.214	14	21 38 29.84	2.3577	19 11 45.0	10.226
15	20 42 40.82	2.4941	22 35 24.1	7.356	15	21 40 51.11	2.3516	19 1 28.2	10.334
16	20 45 10.30	2.4885	22 27 58.5	7.496	16	21 43 12.02	2.3455	18 51 5.0	10.440
17	20 47 39.44	2.4829	22 20 24.5	7.635	17	21 45 32.57	2.3395	18 40 35.6	10.543
18	20 50 8.25	2.4773	22 12 42.3	7.773	18	21 47 52.75	2.3334	18 30 0.0	10.644
19	20 52 36.71	2.4716	22 4 51.9	7.909	19	21 50 12.57	2.3273	18 19 18.3	10.745
20	20 55 4.82	2.4658	21 56 53.3	8.045	20	21 52 32.03	2.3213	18 8 30.6	10.846
21	20 57 32.59	2.4599	21 48 46.5	8.179	21	21 54 51.14	2.3153	17 57 36.8	10.945
22	21 0 0.01	2.4540	21 40 31.8	8.310	22	21 57 9.89	2.3093	17 46 37.2	11.041
23	21 2 27.07	2.4481	21 32 9.3	8.439	23	21 59 28.28	2.3033	17 35 32.0	11.135
24	21 4 53.78	2.4422	S. 21° 23' 39.1"	8.568	24	22 1 46.30	2.2974	S. 17° 24' 21.1"	11.228

PHASES OF THE MOON.

● New Moon,	<sup>d</sup> 7 <sup>h</sup> 12 <sup>m</sup> 32.0
☾ First Quarter,	15 10 11.3
○ Full Moon,	23 1 37.4
☾ Last Quarter,	29 20 21.4
☾ Perigee,	<sup>d</sup> 1 <sup>h</sup> 9.6
☾ Apogee,	14 18.1
☾ Perigee,	26 18.8

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Diff.	III <sup>h</sup> .	P. L. of Diff.	VI <sup>h</sup> .	P. L. of Diff.	IX <sup>h</sup> .	P. L. of Diff.
1	Spica W.	85 6 18	2314	86 51 57	2314	88 37 36	2313	90 23 16	2313
	Antares W.	39 14 3	2332	40 59 16	2332	42 44 34	2335	44 29 57	2323
	Fomalhaut E.	47 16 48	2635	45 38 41	2657	44 1 3	2680	42 23 56	2707
	Venus E.	57 8 43	2695	55 31 57	2695	53 55 11	2695	52 18 25	2695
	$\alpha$ Pegasi E.	67 0 39	2787	65 25 54	2801	63 51 27	2816	62 17 20	2833
	SUN E.	84 49 15	2617	83 10 43	2616	81 32 10	2616	79 53 37	2615
2	Spica W.	99 11 40	2314	100 57 19	2315	102 42 57	2315	104 28 34	2317
	Antares W.	53 17 35	2315	55 3 13	2315	56 48 51	2314	58 34 30	2315
	Fomalhaut E.	34 29 21	2617	32 57 24	2681	31 26 47	2655	29 57 42	3143
	Venus E.	44 14 45	2701	42 38 6	2709	41 1 29	2704	39 24 54	2707
	$\alpha$ Pegasi E.	54 33 9	2852	53 1 56	2895	51 31 24	3090	50 1 36	3060
	SUN E.	71 40 48	2616	70 2 15	2618	68 23 44	2618	66 45 14	2620
3	Antares W.	67 22 35	2318	69 8 8	2330	70 53 39	2332	72 39 7	2334
	$\alpha$ Aquilæ W.	36 55 54	5806	37 43 11	5510	38 33 48	5252	39 27 31	5036
	Saturn W.	25 19 24	2348	27 4 14	2346	28 49 6	2345	30 34 0	2345
	Venus E.	31 23 2	2725	29 46 56	2732	28 10 58	2738	26 35 9	2747
	$\alpha$ Pegasi E.	42 46 45	3341	41 23 21	3490	40 1 27	3508	38 41 12	3608
	SUN E.	58 33 16	2630	56 55 2	2632	55 16 51	2635	53 38 44	2639
4	Antares W.	81 25 35	2338	83 10 39	2342	84 55 38	2346	86 40 31	2350
	$\alpha$ Aquilæ W.	44 34 55	4234	45 42 49	4135	46 52 27	4096	48 3 41	3936
	Saturn W.	39 18 23	2350	41 3 9	2353	42 47 51	2357	44 32 28	2360
	SUN E.	45 29 23	2660	43 51 50	2666	42 14 24	2672	40 37 7	2678
5	Antares W.	95 23 12	2376	97 7 21	2382	98 51 21	2389	100 35 11	2396
	$\alpha$ Aquilæ W.	54 19 30	3614	55 37 49	3569	56 56 57	3598	58 16 50	3492
	Saturn W.	53 14 10	2382	54 58 11	2388	56 42 3	2394	58 25 46	2401
	SUN E.	32 33 5	2720	30 56 52	2731	29 20 53	2742	27 45 9	2756
9	SUN W.	18 17 13	3131	19 44 45	3132	21 12 16	3133	22 39 45	3137
	Jupiter E.	72 53 0	2707	71 16 30	2721	69 40 18	2734	68 4 23	2747
	Pollux E.	73 57 52	2687	72 20 54	2700	70 44 14	2713	69 7 51	2726
	Regulus E.	110 3 53	2693	108 27 4	2705	106 50 31	2717	105 14 14	2730
10	SUN W.	29 55 30	3174	31 22 10	3185	32 48 37	3196	34 14 51	3207
	Jupiter E.	60 9 11	2613	58 35 0	2625	57 1 5	2638	55 27 27	2652
	Pollux E.	61 10 15	2791	59 35 35	2803	58 1 11	2816	56 27 4	2829
	Regulus E.	97 17 0	2793	95 42 23	2805	94 8 2	2818	92 33 57	2831
11	SUN W.	41 22 53	3260	42 47 51	3271	44 12 36	3282	45 37 8	3293
	Jupiter E.	47 43 21	2913	46 11 19	2925	44 39 32	2937	43 8 0	2949
	Pollux E.	48 40 35	2891	47 8 5	2903	45 35 50	2915	44 3 50	2927
	Regulus E.	84 47 30	2890	83 14 58	2901	81 42 40	2912	80 10 37	2924
12	SUN W.	52 36 49	3343	54 0 11	3352	55 23 22	3361	56 46 23	3370
	Jupiter E.	35 33 56	3004	34 3 48	3014	32 33 53	3025	31 4 11	3034
	Pollux E.	36 27 33	2984	34 57 0	2995	33 26 41	3005	31 56 35	3017
	Regulus E.	72 33 44	2975	71 3 0	2984	69 32 27	2993	68 2 6	3001
13	SUN W.	63 39 9	3408	65 1 17	3414	66 23 18	3420	67 45 12	3425
	Aldebaran W.	20 36 14	3148	22 3 25	3140	23 30 46	3133	24 58 15	3128
	Regulus E.	60 32 54	3041	59 3 32	3048	57 34 19	3055	56 5 14	3060
	Spica E.	114 35 6	3052	113 5 58	3058	111 36 57	3063	110 8 2	3069

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Diff.	XV <sup>h</sup> .	P. L. of Diff.	XVIII <sup>h</sup> .	P. L. of Diff.	XXI <sup>h</sup> .	P. L. of Diff.
1	Spica W.	92° 8' 57"	2313	93° 54' 38"	2313	95° 40' 19"	2313	97° 26' 0"	2313
	Antares W.	46 15 23	2320	48 0 53	2319	49 46 25	2317	51 31 59	2316
	Fomalhaut E.	40 47 26	2738	39 11 37	2775	37 36 36	2815	36 2 28	2862
	Venus E.	50 41 39	2696	49 4 54	2697	47 28 10	2698	45 51 27	2698
	α Pegasi E.	60 43 35	2852	59 10 15	2873	57 37 22	2897	56 4 59	2923
	SUN E.	78 15 3	2615	76 36 29	2615	74 57 55	2615	73 19 21	2616
2	Spica W.	106 14 8	2319	107 59 40	2320	109 45 10	2322	111 30 37	2324
	Antares W.	60 20 8	2315	62 5 46	2315	63 51 24	2316	65 37 0	2317
	Fomalhaut E.	28 30 25	2948	27 5 13	3373	25 42 26	3525	24 22 30	3710
	Venus E.	37 48 23	2710	36 11 56	2713	34 35 33	2716	32 59 15	2720
	α Pegasi E.	48 32 37	3104	47 4 32	3154	45 37 28	3209	44 11 30	3271
	SUN E.	65 6 46	2621	63 28 20	2623	61 49 56	2624	60 11 34	2627
3	Antares W.	74 24 32	2326	76 9 53	2328	77 55 11	2331	79 40 25	2334
	α Aquilæ W.	40 24 6	4827	41 23 20	4652	42 25 0	4497	43 28 55	4357
	Saturn W.	32 18 54	2345	34 3 48	2345	35 48 42	2346	37 33 34	2348
	Venus E.	24 59 31	2756	23 24 5	2766	21 48 53	2779	20 13 57	2794
	α Pegasi E.	37 22 46	3722	36 6 22	3852	34 52 13	4001	33 40 34	4172
	SUN E.	52 0 42	2642	50 22 44	2646	48 44 51	2650	47 7 4	2655
4	Antares W.	88 25 17	2355	90 9 57	2359	91 54 30	2365	93 38 55	2371
	α Aquilæ W.	49 16 24	3857	50 30 27	3787	51 45 43	3723	53 2 6	3665
	Saturn W.	46 17 0	2364	48 1 27	2368	49 45 48	2373	51 30 2	2377
	SUN E.	38 59 58	2685	37 22 58	2693	35 46 9	2701	34 9 31	2710
5	Antares W.	102 18 52	2403	104 2 22	2410	105 45 42	2418	107 28 51	2426
	α Aquilæ W.	59 37 23	3460	60 58 32	3431	62 20 13	3407	63 42 22	3384
	Saturn W.	60 9 20	2407	61 52 45	2414	63 36 0	2421	65 19 5	2428
	SUN E.	26 9 43	2769	24 34 35	2785	22 59 48	2804	21 25 25	2826
9	SUN W.	24 7 10	3143	25 34 28	3149	27 1 38	3157	28 28 39	3165
	Jupiter E.	66 28 46	2760	64 53 26	2774	63 18 24	2787	61 43 39	2800
	Pollux E.	67 31 40	2738	65 55 57	2752	64 20 26	2765	62 45 12	2778
	Regulus E.	103 38 14	2743	102 2 31	2755	100 27 4	2768	98 51 54	2780
10	SUN W.	35 40 52	2816	37 6 42	2827	38 32 19	2839	39 57 42	2849
	Jupiter E.	53 54 6	2884	52 21 1	2876	50 48 12	2889	49 15 39	2901
	Pollux E.	54 53 14	2842	53 19 40	2854	51 46 22	2867	50 13 21	2879
	Regulus E.	91 0 9	2842	89 26 36	2855	87 53 19	2868	86 20 17	2878
11	SUN W.	47 1 28	3303	48 25 36	3313	49 49 32	3324	51 13 16	3333
	Jupiter E.	41 36 43	2961	40 5 41	2971	38 34 52	2982	37 4 17	2993
	Pollux E.	42 32 6	2939	41 0 36	2950	39 29 21	2962	37 58 20	2973
	Regulus E.	78 38 48	2924	77 7 12	2945	75 35 50	2955	74 4 41	2965
12	SUN W.	58 9 14	3378	59 31 56	3386	60 54 29	3393	62 16 53	3400
	Jupiter E.	29 34 41	3045	28 5 24	3055	26 36 19	3065	25 7 27	3075
	Pollux E.	30 26 43	3028	28 57 5	3039	27 27 41	3050	25 58 30	3062
	Regulus E.	66 31 55	3010	65 1 55	3018	63 32 5	3026	62 2 25	3034
13	SUN W.	69 7 0	3431	70 28 42	3435	71 50 19	3438	73 11 52	3443
	Aldebaran W.	26 25 51	3194	27 53 31	3192	29 21 14	3119	30 49 0	3117
	Regulus E.	54 36 16	3066	53 7 25	3072	51 38 41	3076	50 10 2	3081
	Spica E.	108 39 14	3073	107 10 31	3077	105 41 53	3080	104 13 19	3083

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.		Noon.	P. L. of Diff.	III <sup>h</sup> .	P. L. of Diff.	VI <sup>h</sup> .	P. L. of Diff.	IX <sup>h</sup> .	P. L. of Diff.
14	SUN	W.	74° 33' 20"	3446	75° 54' 45"	3448	77° 16' 7"	3450	78° 37' 27"	3452
	Aldebaran	W.	32 16 49	3115	33 44 40	3114	35 12 32	3113	36 40 26	3111
	Regulus	E.	48 41 29	3085	47 13 1	3089	45 44 38	3092	44 16 19	3096
	Spica	E.	102 44 49	3086	101 16 22	3088	99 47 59	3091	98 19 38	3092
15	SUN	W.	85 23 48	3453	86 45 5	3451	88 6 24	3449	89 27 45	3446
	Aldebaran	W.	44 0 27	3101	45 28 35	3098	46 56 47	3096	48 25 2	3091
	Regulus	E.	36 55 35	3107	35 27 34	3110	33 59 36	3111	32 31 40	3112
	Spica	E.	90 58 10	3093	89 29 52	3092	88 1 33	3090	86 33 11	3088
16	SUN	W.	96 15 24	3437	97 37 10	3421	98 59 3	3415	100 21 3	3408
	Aldebaran	W.	55 47 33	3069	57 16 21	3062	58 45 17	3056	60 14 20	3050
	Regulus	E.	25 12 29	3125	23 44 50	3130	22 17 17	3136	20 49 51	3144
	Spica	E.	79 10 32	3071	77 41 48	3065	76 12 56	3060	74 43 58	3056
17	SUN	W.	107 13 6	3368	108 35 59	3358	109 59 3	3349	111 22 18	3338
	Aldebaran	W.	67 41 48	3010	69 11 48	3001	70 41 59	2992	72 12 22	2981
	Jupiter	W.	23 50 24	3051	25 19 34	3039	26 48 58	3029	28 18 35	3018
	Pollux	W.	23 34 24	3039	25 3 48	3026	26 33 28	3013	28 3 25	3000
	Spica	E.	67 17 16	3021	65 47 29	3013	64 17 32	3005	62 47 25	2996
	Antares	E.	113 10 42	3012	111 40 44	3002	110 10 34	2993	108 40 12	2983
18	SUN	W.	118 21 40	3282	119 46 13	3269	121 11 1	3256	122 36 4	3243
	Aldebaran	W.	79 47 30	2928	81 19 13	2916	82 51 11	2904	84 23 25	2892
	Jupiter	W.	35 50 8	2960	37 21 11	2948	38 52 29	2935	40 24 3	2921
	Pollux	W.	35 37 14	2935	37 8 49	2921	38 40 41	2908	40 12 50	2894
	Spica	E.	55 13 59	2948	53 42 41	2939	52 11 11	2928	50 39 28	2917
	Antares	E.	101 5 10	2929	99 33 28	2916	98 1 30	2905	96 29 17	2893
19	Aldebaran	W.	92 8 37	2896	93 42 31	2812	95 16 43	2798	96 51 13	2785
	Jupiter	W.	48 6 14	2853	49 39 33	2839	51 13 10	2825	52 47 5	2811
	Pollux	W.	47 57 59	2825	49 31 55	2810	51 6 10	2795	52 40 44	2780
	Spica	E.	42 57 29	2865	41 24 25	2854	39 51 7	2844	38 17 36	2835
	Antares	E.	88 44 9	2827	87 10 16	2813	85 36 5	2799	84 1 36	2785
20	Aldebaran	W.	104 48 21	2713	106 24 44	2698	108 1 27	2684	109 38 29	2669
	Jupiter	W.	60 41 28	2736	62 17 20	2722	63 53 31	2707	65 30 2	2691
	Pollux	W.	60 38 29	2706	62 15 1	2690	63 51 54	2675	65 29 7	2660
	Regulus	W.	24 46 24	2767	26 21 35	2747	27 57 13	2734	29 33 21	2704
	Spica	E.	30 27 9	2796	28 52 36	2792	27 17 58	2791	25 43 18	2791
	Antares	E.	76 4 29	2713	74 28 6	2698	72 51 24	2684	71 14 22	2669
21	Pollux	W.	73 40 22	2585	75 19 38	2569	76 59 15	2555	78 39 12	2540
	Jupiter	W.	73 37 44	2615	75 16 18	2601	76 55 11	2587	78 34 24	2573
	Regulus	W.	37 40 34	2611	39 19 14	2593	40 58 18	2577	42 37 44	2561
	Antares	E.	63 4 19	2597	61 25 20	2583	59 46 2	2569	58 6 25	2556
	Saturn	E.	105 36 1	2589	103 56 51	2574	102 17 21	2559	100 37 30	2545
	α Aquilæ	E.	108 35 28	2428	107 13 54	2408	105 51 46	2379	104 29 5	2351
22	Pollux	W.	87 3 56	2470	88 45 51	2457	90 28 5	2444	92 10 37	2431
	Jupiter	W.	86 55 25	2502	88 36 35	2489	90 18 4	2475	91 59 52	2463
	Regulus	W.	51 0 26	2485	52 42 1	2470	54 23 57	2456	56 6 12	2442
	Antares	E.	49 43 43	2492	48 2 18	2480	46 20 36	2468	44 38 38	2458
	Saturn	E.	92 13 16	2475	90 31 27	2461	88 49 19	2448	87 6 52	2435
	α Aquilæ	E.	97 28 27	2340	96 3 5	2321	94 37 21	2304	93 11 17	2289

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## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.		Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
14	SUN	W.	79° 58' 45"	3454	81° 20' 1"	3454	82° 41' 17"	3454	84° 2' 32"	3454
	Aldebaran	W.	38 8 22	3110	39 36 20	3108	41 4 20	3106	42 32 22	3104
	Regulus	E.	42 48 4	3098	41 19 52	3101	39 51 44	3103	38 23 38	3105
	Spica	E.	96 51 19	3093	95 23 1	3094	93 54 44	3094	92 26 27	3094
15	SUN	W.	90 49 9	3444	92 10 36	3440	93 32 7	3436	94 53 43	3431
	Aldebaran	W.	49 53 22	3088	51 21 46	3083	52 50 16	3079	54 18 51	3073
	Regulus	E.	31 3 45	3114	29 35 52	3115	28 8 1	3118	26 40 13	3121
	Spica	E.	85 4 47	3086	83 36 20	3082	82 7 49	3078	80 39 13	3075
16	SUN	W.	101 43 10	3400	103 5 26	3393	104 27 50	3386	105 50 23	3377
	Aldebaran	W.	61 43 31	3043	63 12 51	3035	64 42 20	3027	66 11 59	3019
	Regulus	E.	19 22 35	3157	17 55 34	3173	16 28 53	3198	15 2 41	3231
	Spica	E.	73 14 54	3049	71 45 42	3043	70 16 22	3035	68 46 53	3029
17	SUN	W.	112 45 45	3398	114 9 24	3317	115 33 16	3306	116 57 21	3294
	Aldebaran	W.	73 42 58	2972	75 13 46	2962	76 44 47	2950	78 16 2	2940
	Jupiter	W.	29 48 26	3007	31 18 30	2996	32 48 48	2985	34 19 20	2973
	Pollux	W.	29 33 38	2986	31 4 8	2973	32 34 54	2961	34 5 56	2948
	Spica	E.	61 17 7	2987	59 46 38	2977	58 15 57	2966	56 45 4	2956
	Antares	E.	107 9 38	2973	105 38 51	2969	104 7 51	2959	102 36 38	2940
18	SUN	W.	124 1 22	3230	125 26 56	3216	126 52 46	3202	128 18 53	3189
	Aldebaran	W.	85 55 54	2979	87 28 40	2966	89 1 42	2953	90 35 1	2940
	Jupiter	W.	41 55 55	2908	43 28 4	2894	45 0 30	2881	46 33 13	2867
	Pollux	W.	41 45 16	2880	43 18 0	2867	44 51 1	2852	46 24 21	2838
	Spica	E.	49 7 31	2907	47 35 21	2896	46 2 57	2886	44 30 20	2875
	Antares	E.	94 56 49	2880	93 24 4	2867	91 51 3	2854	90 17 45	2840
19	Aldebaran	W.	98 26 1	2770	100 1 8	2756	101 36 33	2742	103 12 17	2727
	Jupiter	W.	54 21 19	2796	55 55 52	2782	57 30 44	2766	59 5 56	2751
	Pollux	W.	54 15 38	2766	55 50 51	2750	57 26 24	2735	59 2 17	2721
	Spica	E.	36 43 53	2825	35 9 58	2817	33 35 52	2806	32 1 35	2801
	Antares	E.	82 26 48	2771	80 51 42	2756	79 16 17	2742	77 40 33	2727
20	Aldebaran	W.	111 15 51	2655	112 53 32	2640	114 31 33	2626	116 9 53	2612
	Jupiter	W.	67 6 54	2676	68 44 6	2661	70 21 38	2646	71 59 31	2631
	Pollux	W.	67 6 41	2645	68 44 35	2629	70 22 50	2614	72 1 26	2599
	Regulus	W.	31 9 56	2684	32 46 58	2665	34 24 25	2646	36 2 17	2626
	Spica	E.	24 8 38	2795	22 34 4	2804	20 59 41	2819	19 25 38	2842
	Antares	E.	69 37 0	2655	67 59 19	2640	66 21 18	2626	64 42 58	2612
21	Pollux	W.	80 19 29	2526	82 0 6	2512	83 41 3	2497	85 22 20	2484
	Jupiter	W.	80 13 57	2558	81 53 50	2544	83 34 2	2530	85 14 34	2516
	Regulus	W.	44 17 33	2545	45 57 44	2539	47 38 17	2514	49 19 11	2499
	Antares	E.	56 26 20	2543	54 46 15	2529	53 5 42	2516	51 24 51	2504
	Saturn	E.	98 57 19	2530	97 16 48	2516	95 35 57	2502	93 54 46	2488
	α Aquilæ	E.	103 5 53	3325	101 42 11	3302	100 18 2	3290	98 53 27	3259
22	Pollux	W.	93 53 28	2419	95 36 36	2406	97 20 2	2395	99 3 44	2383
	Jupiter	W.	93 41 57	2450	95 24 20	2438	97 7 0	2426	98 49 57	2415
	Regulus	W.	57 48 47	2429	59 31 40	2416	61 14 52	2404	62 58 21	2391
	Antares	E.	42 56 26	2448	41 13 59	2438	39 31 19	2429	37 48 26	2421
	Saturn	E.	85 24 7	2422	83 41 4	2410	81 57 44	2398	80 14 7	2387
	α Aquilæ	E.	91 44 55	3175	90 18 16	3163	88 51 23	3152	87 24 16	3143

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## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Diff.	III <sup>b</sup> .	P. L. of Diff.	VI <sup>b</sup> .	P. L. of Diff.	IX <sup>b</sup> .	P. L. of Diff.
23	Pollux W.	100 47 43	2372	102 31 58	2361	104 16 29	2350	106 1 15	2341
	Jupiter W.	100 33 10	2404	102 16 39	2393	104 0 24	2382	105 44 24	2373
	Regulus W.	64 42 8	2380	66 26 11	2368	68 10 31	2358	69 55 6	2347
	Antares E.	36 5 21	2413	34 22 5	2408	32 38 41	2402	30 55 9	2398
	Saturn E.	78 30 13	2375	76 46 3	2365	75 1 38	2354	73 16 57	2344
	α Aquilæ E.	85 56 58	3134	84 29 30	3129	83 1 55	3124	81 34 14	3121
24	Regulus W.	78 41 39	2301	80 27 37	2294	82 13 46	2286	84 0 6	2279
	Spica W.	25 4 4	2417	26 47 14	2395	28 30 56	2375	30 15 6	2359
	Saturn E.	64 30 8	2300	62 44 8	2293	60 57 58	2286	59 11 38	2279
	α Aquilæ E.	74 15 42	3134	72 48 14	3143	71 20 56	3154	69 53 52	3168
	Fomalhaut E.	105 5 35	2471	103 23 41	2461	101 41 33	2451	99 59 11	2442
25	Regulus W.	92 54 5	2251	94 41 16	2247	96 28 34	2243	98 15 57	2240
	Spica W.	39 1 17	2298	40 47 20	2289	42 33 36	2281	44 20 3	2274
	Saturn E.	50 17 47	2254	48 30 40	2250	46 43 27	2247	44 56 10	2245
	α Aquilæ E.	62 43 41	3279	61 19 5	3312	59 55 7	3348	58 31 51	3389
	Fomalhaut E.	91 24 33	2410	89 41 12	2405	87 57 45	2402	86 14 13	2399
	α Pegasi E.	109 7 16	2700	107 30 36	2687	105 53 38	2675	104 16 24	2663
26	Regulus W.	107 13 54	2231	109 1 36	2229	110 49 20	2229	112 37 4	2229
	Spica W.	53 14 24	2252	55 1 34	2249	56 48 48	2248	58 36 4	2246
	Saturn E.	35 59 8	2241	34 11 42	2243	32 24 19	2245	30 36 59	2249
	α Aquilæ E.	51 48 59	3677	50 31 47	3755	49 15 58	3842	48 1 39	3933
	Fomalhaut E.	77 35 55	2397	75 52 16	2398	74 8 39	2401	72 25 6	2405
	α Pegasi E.	96 7 11	2630	94 28 57	2626	92 50 38	2625	91 12 17	2625
	Venus E.	119 41 5	2607	118 2 19	2607	116 23 33	2605	114 44 45	2604
27	Spica W.	67 32 47	2245	69 20 7	2247	71 7 25	2248	72 54 41	2250
	Antares W.	21 50 38	2330	23 35 54	2317	25 21 29	2307	27 7 18	2300
	Fomalhaut E.	63 49 2	2436	62 6 19	2445	60 23 48	2455	58 41 32	2467
	α Pegasi E.	83 0 49	2637	81 22 44	2643	79 44 48	2650	78 7 1	2658
	Venus E.	106 30 45	2608	104 52 1	2610	103 13 20	2612	101 34 41	2615
	SUN E.	127 50 33	2530	126 10 2	2532	124 29 33	2533	122 49 6	2535
28	Spica W.	81 50 9	2264	83 37 1	2268	85 23 47	2272	87 10 27	2277
	Antares W.	35 58 18	2286	37 44 38	2286	39 30 58	2287	41 17 16	2289
	Fomalhaut E.	50 14 53	2546	48 34 44	2568	46 55 5	2591	45 15 58	2618
	α Pegasi E.	70 1 22	2717	68 25 5	2734	66 49 10	2751	65 13 38	2769
	Venus E.	93 22 28	2632	91 44 16	2636	90 6 10	2640	88 28 10	2645
	SUN E.	114 27 45	2551	112 47 42	2555	111 7 45	2559	109 27 54	2564
29	Spica W.	96 2 7	2301	97 48 5	2307	99 33 54	2313	101 19 35	2319
	Antares W.	50 7 58	2304	51 53 52	2308	53 39 40	2313	55 25 21	2317
	Fomalhaut E.	37 10 48	2605	35 36 26	2658	34 3 13	2619	32 31 18	2669
	α Pegasi E.	57 22 59	2695	55 50 34	2697	54 18 49	2692	52 47 48	2690
	Venus E.	80 19 51	2672	78 42 33	2678	77 5 24	2684	75 28 22	2690
	SUN E.	101 10 17	2589	99 31 7	2594	97 52 4	2600	96 13 9	2607
30	Antares W.	64 12 1	2344	65 56 57	2349	67 41 45	2355	69 26 25	2361
	α Aquilæ W.	35 50 16	2505	36 30 31	2526	37 14 26	2504	38 1 44	2506
	Saturn W.	21 38 42	2380	23 22 46	2378	25 6 52	2379	26 50 57	2380
	α Pegasi E.	45 26 9	3254	44 1 4	3323	42 37 19	3398	41 15 0	3462
	Venus E.	67 25 23	2723	65 49 14	2730	64 13 14	2738	62 37 24	2744
	SUN E.	88 0 43	2638	86 22 39	2645	84 11 45	2652	83 7 0	2658

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## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
23	Pollux W.	107° 46' 15"	2331	109° 31' 29"	2322	111° 16' 57"	2313	113° 2' 37"	2304
	Jupiter W.	107 28 39	2363	109 13 7	2354	110 57 48	2345	112 42 42	2337
	Regulus W.	71 39 57	2337	73 25 2	2328	75 10 21	2318	76 55 54	2310
	Antares E.	29 11 32	2397	27 27 53	2396	25 44 13	2399	24 0 37	2405
	Saturn E.	71 32 2	2335	69 46 53	2396	68 1 31	2317	66 15 56	2308
	α Aquilæ E.	80 6 30	3120	78 38 45	3120	77 11 0	3123	75 43 18	3128
24	Regulus W.	85 46 36	2272	87 33 16	2267	89 20 4	2261	91 7 1	2256
	Spica W.	31 59 40	2343	33 44 37	2329	35 29 54	2317	37 15 28	2307
	Saturn E.	57 25 8	2273	55 38 29	2268	53 51 42	2263	52 4 48	2258
	α Aquilæ E.	68 27 4	3184	67 0 36	3203	65 34 30	3225	64 8 51	3250
	Fomalhaut E.	98 16 36	2434	96 33 50	2426	94 50 53	2420	93 7 47	2415
25	Regulus W.	100 3 25	2237	101 50 58	2235	103 38 34	2233	105 26 13	2231
	Spica W.	46 6 40	2268	47 53 26	2264	49 40 19	2259	51 27 19	2256
	Saturn E.	43 8 50	2243	41 21 26	2241	39 34 0	2241	37 46 34	2241
	α Aquilæ E.	57 9 22	3434	55 47 44	3486	54 27 4	3543	53 7 27	3606
	Fomalhaut E.	84 30 37	2397	82 46 58	2396	81 3 17	2396	79 19 36	2396
	α Pegasi E.	102 38 55	2654	101 1 13	2646	99 23 21	2640	97 45 20	2634
26	Regulus W.	114 24 48	2220	116 12 31	2221	118 0 12	2223	119 47 51	2225
	Spica W.	60 23 23	2245	62 10 44	2245	63 58 5	2245	65 45 26	2245
	Saturn E.	28 49 44	2253	27 2 35	2258	25 15 34	2265	23 28 43	2272
	α Aquilæ E.	46 48 59	4047	45 38 6	4168	44 29 10	4303	43 22 20	4455
	Fomalhaut E.	70 41 38	2409	68 58 16	2415	67 15 2	2421	65 31 57	2428
	α Pegasi E.	89 33 56	2625	87 55 35	2626	86 17 16	2629	84 39 0	2632
	Venus E.	113 5 56	2604	111 27 7	2604	109 48 18	2606	108 9 31	2607
27	Spica W.	74 41 54	2252	76 29 4	2255	78 16 10	2258	80 3 12	2261
	Antares W.	28 53 18	2294	30 39 26	2290	32 25 40	2287	34 11 58	2286
	Fomalhaut E.	56 59 32	2480	55 17 50	2494	53 36 28	2510	51 55 28	2527
	α Pegasi E.	76 29 25	2667	74 52 1	2678	73 14 52	2689	71 37 58	2703
	Venus E.	99 56 6	2618	98 17 35	2621	96 39 8	2624	95 0 46	2627
	Sun E.	121 8 42	2538	119 28 22	2540	117 48 5	2544	116 7 53	2547
28	Spica W.	88 57 1	2281	90 43 29	2286	92 29 49	2291	94 16 2	2296
	Antares W.	43 3 32	2291	44 49 45	2294	46 35 54	2296	48 21 59	2300
	Fomalhaut E.	43 37 27	2647	41 59 36	2660	40 22 29	2716	38 46 11	2758
	α Pegasi E.	63 38 30	2791	62 3 50	2814	60 29 40	2838	58 56 2	2866
	Venus E.	86 50 16	2650	85 12 29	2655	83 34 49	2660	81 57 16	2666
	Sun E.	107 48 9	2569	106 8 31	2573	104 28 59	2578	102 49 34	2584
29	Spica W.	103 5 7	2325	104 50 30	2331	106 35 44	2338	108 20 48	2344
	Antares W.	57 10 56	2322	58 56 24	2327	60 41 44	2332	62 26 57	2338
	Fomalhaut E.	31 0 52	2071	29 32 7	2167	28 5 18	2278	26 40 41	2410
	α Pegasi E.	51 17 35	3042	49 48 14	3087	48 19 49	3138	46 52 26	3193
	Venus E.	73 51 29	2696	72 14 44	2703	70 38 8	2710	69 1 41	2716
	Sun E.	94 34 23	2612	92 55 45	2619	91 17 16	2625	89 38 55	2632
30	Antares W.	71 10 56	2367	72 55 18	2373	74 39 31	2380	76 23 35	2386
	α Aquilæ W.	38 52 10	5261	39 45 31	5067	40 41 34	4879	41 40 6	4710
	Saturn W.	28 35 0	2322	30 19 0	2326	32 2 55	2329	33 46 45	2334
	α Pegasi E.	39 54 16	3576	38 35 15	3681	37 18 8	3800	36 3 6	3934
	Venus E.	61 1 43	2751	59 26 11	2759	57 50 49	2766	56 15 37	2774
	Sun E.	81 29 24	2666	79 51 58	2672	78 14 41	2680	76 37 34	2687



## AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S						Sidereal Time of the Semi-diameter passing the Meridian.	Equation of Time, to be subtracted from Apparent Time.	Diff. for 1 hour.
		Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Semi-diameter.				
Wed.	1	<sup>h</sup> 2 <sup>m</sup> 35 <sup>s</sup> 46.30	9.553	N. 15° 15' 18.9"	45.00	15' 54.03"	66.09	<sup>m</sup> 3 <sup>s</sup> 6.01	0.302	
Thur.	2	2 39 35.85	9.576	15 33 11.6	44.38	15 53.79	66.17	3 12.99	0.279	
Frid.	3	2 43 25.97	9.600	15 50 48.9	43.73	15 53.55	66.25	3 19.41	0.255	
Sat.	4	2 47 16.66	9.624	16 8 10.7	43.07	15 53.32	66.33	3 25.26	0.231	
Sun.	5	2 51 7.92	9.648	16 25 16.6	42.41	15 53.09	66.41	3 30.54	0.207	
Mon.	6	2 54 59.76	9.672	16 42 6.2	41.72	15 52.87	66.49	3 35.24	0.183	
Tues.	7	2 58 52.17	9.696	16 58 39.2	41.02	15 52.65	66.57	3 39.37	0.159	
Wed.	8	3 2 45.16	9.720	17 14 55.3	40.32	15 52.42	66.64	3 42.93	0.136	
Thur.	9	3 6 38.72	9.744	17 30 54.1	39.59	15 52.21	66.74	3 45.93	0.112	
Frid.	10	3 10 32.84	9.767	17 46 35.3	38.85	15 52.00	66.82	3 48.36	0.089	
Sat.	11	3 14 27.53	9.791	18 1 58.6	38.10	15 51.79	66.90	3 50.22	0.065	
Sun.	12	3 18 22.79	9.814	18 17 3.8	37.34	15 51.59	66.99	3 51.51	0.042	
Mon.	13	3 22 18.61	9.837	18 31 50.7	36.56	15 51.39	67.07	3 52.25	+0.019	
Tues.	14	3 26 14.98	9.860	18 46 18.6	35.77	15 51.20	67.15	3 52.43	-0.004	
Wed.	15	3 30 11.91	9.883	19 0 27.5	34.97	15 51.01	67.23	3 52.05	0.030	
Thur.	16	3 34 9.40	9.906	19 14 17.0	34.15	15 50.82	67.32	3 51.11	0.051	
Frid.	17	3 38 7.44	9.929	19 27 46.9	33.33	15 50.64	67.40	3 49.64	0.073	
Sat.	18	3 42 6.01	9.951	19 40 56.8	32.50	15 50.46	67.48	3 47.63	0.095	
Sun.	19	3 46 5.13	9.974	19 53 46.8	31.66	15 50.28	67.56	3 45.09	0.118	
Mon.	20	3 50 4.78	9.996	20 6 16.4	30.80	15 50.11	67.64	3 42.00	0.140	
Tues.	21	3 54 4.96	10.018	20 18 25.4	29.95	15 49.94	67.72	3 38.39	0.162	
Wed.	22	3 58 5.67	10.040	20 30 13.7	29.07	15 49.77	67.79	3 34.24	0.183	
Thur.	23	4 2 6.92	10.062	20 41 41.0	28.19	15 49.59	67.86	3 29.57	0.205	
Frid.	24	4 6 8.68	10.085	20 52 47.0	27.29	15 49.43	67.93	3 24.37	0.228	
Sat.	25	4 10 10.96	10.106	21 3 31.3	26.39	15 49.26	68.00	3 18.67	0.249	
Sun.	26	4 14 13.74	10.127	21 13 54.1	25.49	15 49.10	68.07	3 12.46	0.270	
Mon.	27	4 18 17.00	10.147	21 23 55.1	24.57	15 48.94	68.15	3 5.76	0.290	
Tues.	28	4 22 20.76	10.167	21 33 34.0	23.65	15 48.79	68.21	2 58.58	0.310	
Wed.	29	4 26 25.00	10.186	21 42 50.5	22.71	15 48.64	68.27	2 50.93	0.329	
Thur.	30	4 30 29.70	10.205	21 51 44.4	21.77	15 48.49	68.33	2 42.82	0.348	
Frid.	31	4 34 34.84	10.223	22 0 15.8	20.83	15 48.35	68.39	2 34.25	0.366	
Sat.	32	4 38 40.42	10.240	N. 22° 8' 24.2"	19.87	15 48.21	68.44	2 25.26	0.383	

NOTE.—Mean Time of the Semidiameter passing may be found by subtracting 0.18 from the Sidereal Time.

AT GREENWICH MEAN NOON.									
Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time, to be added to Mean Time.	Diff. for 1 hour.	Sidereal Time or Right Ascension of Mean Sun.	
		Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.				
Wed.	1	<sup>h</sup> 2 <sup>m</sup> 35 <sup>s</sup> 46.79	9.554	N. 15° 15' 21.2"	45.00	<sup>m</sup> 3 <sup>s</sup> 6.03	0.302	<sup>h</sup> 2 <sup>m</sup> 38 <sup>s</sup> 52.82	
Thur.	2	2 39 36.36	9.577	15 33 13.9	44.38	3 13.01	0.279	2 42 49.37	
Frid.	3	2 43 26.50	9.601	15 50 51.3	43.73	3 19.43	0.255	2 46 45.93	
Sat.	4	2 47 17.21	9.625	16 8 13.2	43.07	3 25.28	0.231	2 50 42.49	
Sun.	5	2 51 8.49	9.649	16 25 19.1	42.41	3 30.57	0.207	2 54 39.04	
Mon.	6	2 55 0.34	9.673	16 42 8.7	41.72	3 35.26	0.183	2 58 35.60	
Tues.	7	2 58 52.76	9.697	16 58 41.7	41.02	3 39.39	0.159	3 2 32.15	
Wed.	8	3 2 45.76	9.720	17 14 57.8	40.32	3 42.95	0.136	3 6 28.71	
Thur.	9	3 6 39.33	9.744	17 30 56.6	39.59	3 45.93	0.112	3 10 25.26	
Frid.	10	3 10 33.46	9.767	17 46 37.8	38.85	3 48.36	0.089	3 14 21.82	
Sat.	11	3 14 28.16	9.791	18 2 1.1	38.10	3 50.22	0.065	3 18 18.38	
Sun.	12	3 18 23.42	9.814	18 17 6.2	37.34	3 51.51	0.042	3 22 14.93	
Mon.	13	3 22 19.24	9.837	18 31 53.0	36.56	3 52.25	+0.019	3 26 11.49	
Tues.	14	3 26 15.62	9.860	18 46 20.9	35.77	3 52.43	-0.004	3 30 8.05	
Wed.	15	3 30 12.55	9.883	19 0 29.7	34.97	3 52.05	0.030	3 34 4.60	
Thur.	16	3 34 10.04	9.906	19 14 19.1	34.15	3 51.11	0.051	3 38 1.15	
Frid.	17	3 38 8.07	9.929	19 27 49.0	33.33	3 49.64	0.073	3 41 57.71	
Sat.	18	3 42 6.64	9.951	19 40 58.9	32.50	3 47.63	0.095	3 45 54.27	
Sun.	19	3 46 5.75	9.974	19 53 48.8	31.66	3 45.08	0.118	3 49 50.83	
Mon.	20	3 50 5.40	9.996	20 6 18.3	30.80	3 41.99	0.140	3 53 47.39	
Tues.	21	3 54 5.57	10.018	20 18 27.2	29.95	3 38.37	0.162	3 57 43.94	
Wed.	22	3 58 6.27	10.039	20 30 15.4	29.07	3 34.23	0.183	4 1 40.50	
Thur.	23	4 2 7.50	10.061	20 41 42.6	28.19	3 29.56	0.205	4 5 37.06	
Frid.	24	4 6 9.25	10.084	20 52 48.5	27.29	3 24.36	0.228	4 9 33.61	
Sat.	25	4 10 11.51	10.105	21 3 32.8	26.39	3 18.66	0.249	4 13 30.17	
Sun.	26	4 14 14.27	10.126	21 13 55.5	25.49	3 12.46	0.270	4 17 26.73	
Mon.	27	4 18 17.52	10.146	21 23 56.4	24.57	3 5.76	0.290	4 21 23.28	
Tues.	28	4 22 21.26	10.166	21 33 35.1	23.65	2 58.58	0.310	4 25 19.84	
Wed.	29	4 26 25.48	10.185	21 42 51.5	22.71	2 50.92	0.329	4 29 16.40	
Thur.	30	4 30 30.16	10.204	21 51 45.4	21.77	2 42.80	0.348	4 33 12.96	
Frid.	31	4 34 35.28	10.222	22 0 16.7	20.83	2 34.23	0.366	4 37 9.51	
Sat.	32	4 38 40.83	10.239	N. 22° 8' 25.0"	19.87	2 25.24	0.383	4 41 6.07	
NOTE.—The Semidiameter for Mean Noon may be assumed the same as that for Apparent Noon.								Diff. for 1 hour +9°.8565	

AT GREENWICH MEAN NOON.									
Day of the Month.	Day of the Year.	THE SUN'S				Logarithm of the Radius Vector of the Earth.	Diff. for 1 hour.	Mean Time of Sidereal Oh.	
		True LONGITUDE.		Diff. for 1 hour.	LATITUDE.				
		$\lambda$	$\lambda'$						
1	122	41° 23' 7.9	23' 9.0	145.40	−0.63	0.0036151	+45.7	21 17 37.29	
2	123	42 21 16.8	21 17.8	145.34	0.67	.0037242	45.1	21 13 41.38	
3	124	43 19 24.2	19 25.1	145.28	0.67	.0038319	44.5	21 9 45.47	
4	125	44 17 30.2	17 30.9	145.22	0.65	.0039380	43.8	21 5 49.57	
5	126	45 15 34.8	15 35.3	145.16	0.60	.0040424	43.1	21 1 53.66	
6	127	46 13 37.8	13 38.2	145.09	0.52	.0041450	42.3	20 57 57.75	
7	128	47 11 39.2	11 39.4	145.03	0.40	.0042458	41.6	20 54 1.83	
8	129	48 9 39.1	9 39.2	144.96	0.28	.0043448	40.8	20 50 5.92	
9	130	49 7 37.4	7 37.3	144.89	0.14	.0044419	40.1	20 46 10.01	
10	131	50 5 34.0	5 33.8	144.82	−0.01	.0045371	39.3	20 42 14.10	
11	132	51 3 29.0	3 28.7	144.75	+0.11	.0046305	38.6	20 38 18.20	
12	133	52 1 22.2	1 21.7	144.68	0.23	.0047220	37.8	20 34 22.29	
13	134	52 59 13.6	59 13.0	144.61	0.32	.0048117	37.1	20 30 26.38	
14	135	53 57 3.2	57 2.4	144.54	0.40	.0048998	36.4	20 26 30.47	
15	136	54 54 51.2	54 50.3	144.47	0.45	.0049865	35.8	20 22 34.55	
16	137	55 52 37.6	52 36.5	144.40	0.46	.0050717	35.2	20 18 38.64	
17	138	56 50 22.4	50 21.2	144.33	0.45	.0051555	34.7	20 14 42.73	
18	139	57 48 5.6	48 4.2	144.27	0.41	.0052381	34.2	20 10 46.82	
19	140	58 45 47.1	45 45.6	144.20	0.34	.0053197	33.7	20 6 50.90	
20	141	59 43 27.1	43 25.4	144.14	0.25	.0054002	33.2	20 2 54.99	
21	142	60 41 5.6	41 3.8	144.08	+0.13	.0054795	32.8	19 58 59.08	
22	143	61 38 42.9	38 40.9	144.03	0.00	.0055578	32.4	19 55 3.17	
23	144	62 36 19.0	36 16.9	143.98	−0.13	.0056351	32.0	19 51 7.26	
24	145	63 33 54.0	33 51.7	143.94	0.26	.0057113	31.5	19 47 11.35	
25	146	64 31 27.8	31 25.4	143.89	0.38	.0057865	31.0	19 43 15.44	
26	147	65 29 0.6	28 58.0	143.85	0.49	.0058605	30.5	19 39 19.53	
27	148	66 26 32.4	26 29.6	143.81	0.58	.0059332	29.9	19 35 23.62	
28	149	67 24 3.4	24 0.4	143.77	0.64	.0060045	29.3	19 31 27.71	
29	150	68 21 33.6	21 30.4	143.74	0.67	.0060743	28.7	19 27 31.80	
30	151	69 19 3.1	18 59.7	143.71	0.68	.0061424	28.0	19 23 35.89	
31	152	70 16 31.9	16 28.4	143.68	0.66	.0062085	27.2	19 19 39.97	
32	153	71 13 59.9	13 56.2	143.65	−0.61	0.0062727	+26.3	19 15 44.06	
NOTE: $\lambda$ corresponds to the true equinox of the date, $\lambda'$ to the mean equinox of January 0d.								Diff. for 1 hour −9°.8296	

## GREENWICH MEAN TIME.

Day of the Month.	THE MOON'S									
	SEMI- DIAMETER.		HORIZONTAL PARALLAX.				MERIDIAN PASSAGE.		AGE.	
	Noon.	Midnight.	Noon.	Diff. for 1 hour.	Midnight.	Diff. for 1 hour.		Diff. for 1 hour.	Noon.	
							<sup>h</sup> <sup>m</sup>	<sup>m</sup>	<sup>d</sup>	
1	16 1.5	15 58.3	58 42.4	-0.98	58 30.3	-1.03	20 4.6	2.09	23.5	
2	15 54.8	15 51.3	58 17.7	1.07	58 4.6	1.11	20 53.3	1.98	24.5	
3	15 47.6	15 43.8	57 51.0	1.15	57 37.1	1.18	21 39.9	1.91	25.5	
4	15 39.9	15 35.9	57 22.8	1.20	57 8.2	1.23	22 25.3	1.88	26.5	
5	15 31.9	15 27.8	56 53.3	1.24	56 38.3	1.26	23 10.5	1.89	27.5	
6	15 23.6	15 19.5	56 23.2	1.26	56 8.0	1.26	23 56.4	1.94	28.5	
7	15 15.4	15 11.4	55 53.0	1.24	55 38.3	1.21	6		29.5	
8	15 7.6	15 3.9	55 24.1	1.16	55 10.5	1.10	0 43.6	1.98	0.9	
9	15 0.4	14 57.2	54 57.7	1.02	54 46.1	0.92	1 32.2	2.05	1.9	
10	14 54.4	14 51.9	54 35.6	0.81	54 26.7	0.68	2 22.1	2.09	2.9	
11	14 49.9	14 48.5	54 19.4	0.53	54 14.0	0.37	3 12.6	2.10	3.9	
12	14 47.6	14 47.2	54 10.6	-0.19	54 9.4	-0.00	4 2.9	2.08	4.9	
13	14 47.5	14 48.5	54 10.6	+0.19	54 14.1	+0.40	4 52.2	2.02	5.9	
14	14 50.2	14 52.5	54 20.2	0.61	54 28.8	0.79	5 39.9	1.95	6.9	
15	14 55.5	14 59.2	54 39.8	1.03	54 53.4	1.23	6 26.1	1.89	7.9	
16	15 3.6	15 8.6	55 9.4	1.43	55 27.8	1.62	7 10.8	1.85	8.9	
17	15 14.1	15 20.2	55 48.2	1.78	56 10.5	1.93	7 54.9	1.83	9.9	
18	15 26.7	15 33.6	56 34.4	2.05	56 59.5	2.13	8 39.1	1.86	10.9	
19	15 40.6	15 47.7	57 25.4	2.18	57 51.6	2.18	9 24.5	1.94	11.9	
20	15 54.8	16 1.6	58 17.6	2.14	58 42.7	2.04	10 12.3	2.06	12.9	
21	16 8.1	16 14.0	59 6.4	1.90	59 28.1	1.71	11 3.6	2.23	13.9	
22	16 19.2	16 23.6	59 47.2	1.48	60 3.4	1.21	11 59.2	2.42	14.9	
23	16 27.1	16 29.6	60 16.3	0.92	60 25.5	+0.61	12 59.4	2.58	15.9	
24	16 31.1	16 31.5	60 30.8	+0.29	60 32.4	-0.03	14 2.8	2.67	16.9	
25	16 30.9	16 29.3	60 30.2	-0.33	60 24.4	0.61	15 7.2	2.64	17.9	
26	16 26.9	16 23.7	60 15.5	0.86	60 3.8	1.08	16 9.6	2.52	18.9	
27	16 19.9	16 15.5	59 49.8	1.26	59 33.8	1.40	15 8.0	2.34	19.9	
28	16 10.8	16 5.8	59 16.4	1.50	58 57.9	1.57	18 2.0	2.16	20.9	
29	16 0.6	15 55.3	58 38.8	1.60	58 19.5	1.62	18 51.8	2.01	21.9	
30	15 50.0	15 44.8	58 0.1	1.61	57 40.9	1.58	19 38.7	1.91	22.9	
31	15 39.7	15 34.7	57 22.1	1.54	57 3.9	1.49	20 23.8	1.86	23.9	
32	15 29.9	15 25.3	56 46.3	-1.44	56 29.4	-1.38	21 8.3	1.86	24.9	

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
WEDNESDAY 1.					FRIDAY 3.				
0	22 1 46.30	2.2974	S. 17° 24' 21.1"	11.228	0	23 46 3.17	2.0688	S. 7° 5' 7.0"	14.038
1	22 4 3.97	2.2916	17 13 4.6	11.320	1	23 48 7.20	2.0655	6 51 3.9	14.064
2	22 6 21.30	2.2858	17 1 42.6	11.411	2	23 50 11.03	2.0622	6 36 59.3	14.088
3	22 8 38.28	2.2800	16 50 15.2	11.501	3	23 52 14.66	2.0590	6 22 53.3	14.111
4	22 10 54.91	2.2742	16 38 42.5	11.589	4	23 54 18.11	2.0560	6 8 46.0	14.139
5	22 13 11.19	2.2684	16 27 4.6	11.675	5	23 56 21.38	2.0530	5 54 37.4	14.153
6	22 15 27.12	2.2627	16 15 21.6	11.760	6	23 58 24.47	2.0500	5 40 27.6	14.173
7	22 17 42.71	2.2570	16 3 33.5	11.843	7	0 0 27.39	2.0472	5 26 16.6	14.192
8	22 19 57.96	2.2513	15 51 40.5	11.924	8	0 2 30.14	2.0443	5 12 4.6	14.209
9	22 22 12.88	2.2457	15 39 42.6	12.004	9	0 4 32.72	2.0415	4 57 51.6	14.225
10	22 24 27.46	2.2401	15 27 39.9	12.083	10	0 6 35.14	2.0389	4 43 37.7	14.239
11	22 26 41.70	2.2345	15 15 32.6	12.160	11	0 8 37.40	2.0363	4 29 23.0	14.253
12	22 28 55.61	2.2290	15 3 20.7	12.235	12	0 10 39.51	2.0338	4 15 7.5	14.264
13	22 31 9.19	2.2236	14 51 4.3	12.310	13	0 12 41.47	2.0314	4 0 51.3	14.274
14	22 33 22.45	2.2183	14 38 43.5	12.384	14	0 14 43.29	2.0290	3 46 34.5	14.283
15	22 35 35.39	2.2130	14 26 18.3	12.456	15	0 16 44.96	2.0267	3 32 17.2	14.292
16	22 37 48.01	2.2077	14 13 48.8	12.526	16	0 18 46.50	2.0245	3 17 59.4	14.301
17	22 40 0.32	2.2024	14 1 15.2	12.594	17	0 20 47.91	2.0223	3 3 41.1	14.308
18	22 42 12.31	2.1972	13 48 37.6	12.660	18	0 22 49.18	2.0202	2 49 22.5	14.313
19	22 44 23.99	2.1920	13 35 56.0	12.726	19	0 24 50.33	2.0182	2 35 3.6	14.317
20	22 46 35.36	2.1868	13 23 10.5	12.791	20	0 26 51.36	2.0162	2 20 44.6	14.319
21	22 48 46.42	2.1817	13 10 21.1	12.854	21	0 28 52.28	2.0143	2 6 25.4	14.320
22	22 50 57.18	2.1767	12 57 28.0	12.916	22	0 30 53.08	2.0125	1 52 6.2	14.320
23	22 53 7.65	2.1719	S. 12 44 31.3	12.976	23	0 32 53.78	2.0107	S. 1 37 47.0	14.321
THURSDAY 2.					SATURDAY 4.				
0	22 55 17.83	2.1671	S. 12 31 30.9	13.035	0	0 34 54.37	2.0090	S. 1 23 27.7	14.320
1	22 57 27.71	2.1623	12 18 27.1	13.092	1	0 36 54.86	2.0073	1 9 8.6	14.317
2	22 59 37.31	2.1576	12 5 19.9	13.147	2	0 38 55.26	2.0058	0 54 49.8	14.312
3	23 1 46.62	2.1529	11 52 9.4	13.201	3	0 40 55.57	2.0043	0 40 31.3	14.306
4	23 3 55.65	2.1482	11 38 55.7	13.254	4	0 42 55.79	2.0028	0 26 13.1	14.299
5	23 6 4.41	2.1437	11 25 38.9	13.307	5	0 44 55.92	2.0014	S. 0 11 55.3	14.292
6	23 8 12.89	2.1391	11 12 18.9	13.358	6	0 46 55.97	2.0002	N. 0 2 22.0	14.284
7	23 10 21.10	2.1346	10 58 55.9	13.407	7	0 48 55.95	1.9990	0 16 38.8	14.274
8	23 12 29.05	2.1302	10 45 30.1	13.454	8	0 50 55.86	1.9978	0 30 54.9	14.263
9	23 14 36.73	2.1258	10 32 1.5	13.500	9	0 52 55.69	1.9967	0 45 10.4	14.252
10	23 16 44.15	2.1215	10 18 30.1	13.545	10	0 54 55.46	1.9957	0 59 25.2	14.239
11	23 18 51.32	2.1174	10 4 56.1	13.589	11	0 56 55.17	1.9947	1 13 39.1	14.225
12	23 20 58.25	2.1133	9 51 19.4	13.633	12	0 58 54.83	1.9938	1 27 52.1	14.210
13	23 23 4.93	2.1092	9 37 40.2	13.673	13	1 0 54.43	1.9930	1 42 4.2	14.194
14	23 25 11.36	2.1051	9 23 58.7	13.712	14	1 2 53.99	1.9922	1 56 15.3	14.177
15	23 27 17.54	2.1010	9 10 14.8	13.751	15	1 4 53.50	1.9915	2 10 25.4	14.158
16	23 29 23.49	2.0972	8 56 28.6	13.783	16	1 6 52.97	1.9908	2 24 34.3	14.138
17	23 31 29.22	2.0935	8 42 40.3	13.824	17	1 8 52.40	1.9902	2 38 42.0	14.118
18	23 33 34.72	2.0898	8 28 49.8	13.858	18	1 10 51.80	1.9897	2 52 48.4	14.096
19	23 35 40.00	2.0861	8 14 57.3	13.891	19	1 12 51.17	1.9893	3 6 53.5	14.074
20	23 37 45.06	2.0823	8 1 2.9	13.923	20	1 14 50.52	1.9888	3 20 57.2	14.050
21	23 39 49.89	2.0787	7 47 6.5	13.954	21	1 16 49.84	1.9885	3 34 59.5	14.025
22	23 41 54.51	2.0753	7 33 8.3	13.983	22	1 18 49.14	1.9882	3 49 0.2	13.999
23	23 43 58.94	2.0721	7 19 8.5	14.011	23	1 20 48.43	1.9880	4 2 59.3	13.973
24	23 46 3.17	2.0688	S. 7 5 7.0	14.038	24	1 22 47.71	1.9878	N. 4 16 56.9	13.946

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SUNDAY 5.					TUESDAY 7.				
0	1 <sup>h</sup> 22 <sup>m</sup> 47.71 <sup>s</sup>	1.9878	N. 4° 16' 56.9"	13.946	0	2 <sup>h</sup> 59 <sup>m</sup> 2.39 <sup>s</sup>	2.0397	N. 14° 35' 2.6"	11.441
1	1 24 46.98	1.9877	4 30 52.8	13.917	1	3 1 4.83	2.0417	14 46 26.8	11.365
2	1 26 46.24	1.9877	4 44 46.8	13.886	2	3 3 7.39	2.0438	14 57 46.4	11.289
3	1 28 45.51	1.9878	4 58 39.0	13.854	3	3 5 10.08	2.0458	15 9 1.4	11.212
4	1 30 44.78	1.9879	5 12 29.3	13.822	4	3 7 12.89	2.0479	15 20 11.8	11.134
5	1 32 44.06	1.9880	5 26 17.6	13.790	5	3 9 15.83	2.0501	15 31 17.5	11.056
6	1 34 43.34	1.9881	5 40 4.0	13.756	6	3 11 18.90	2.0522	15 42 18.5	10.977
7	1 36 42.63	1.9883	5 53 48.3	13.720	7	3 13 22.10	2.0544	15 53 14.7	10.897
8	1 38 41.94	1.9886	6 7 30.4	13.683	8	3 15 25.43	2.0566	16 4 6.0	10.816
9	1 40 41.28	1.9890	6 21 10.3	13.646	9	3 17 28.89	2.0588	16 14 52.5	10.734
10	1 42 40.64	1.9895	6 34 48.0	13.609	10	3 19 32.48	2.0610	16 25 34.0	10.651
11	1 44 40.02	1.9899	6 48 23.3	13.570	11	3 21 36.21	2.0633	16 36 10.5	10.568
12	1 46 39.43	1.9904	7 1 56.3	13.529	12	3 23 40.08	2.0656	16 46 42.1	10.484
13	1 48 38.87	1.9910	7 15 26.9	13.488	13	3 25 44.08	2.0678	16 57 8.6	10.399
14	1 50 38.35	1.9916	7 28 54.9	13.445	14	3 27 48.22	2.0701	17 7 29.9	10.312
15	1 52 37.87	1.9923	7 42 20.3	13.402	15	3 29 52.49	2.0723	17 17 46.0	10.225
16	1 54 37.43	1.9930	7 55 43.1	13.358	16	3 31 56.90	2.0746	17 27 56.9	10.138
17	1 56 37.04	1.9938	8 9 3.2	13.314	17	3 34 1.45	2.0770	17 38 2.5	10.049
18	1 58 36.70	1.9947	8 22 20.7	13.268	18	3 36 6.15	2.0793	17 48 2.8	9.960
19	2 0 36.41	1.9956	8 35 35.4	13.221	19	3 38 10.98	2.0816	17 57 57.7	9.870
20	2 2 36.17	1.9965	8 48 47.1	13.173	20	3 40 15.95	2.0840	18 7 47.2	9.780
21	2 4 35.99	1.9975	9 1 55.9	13.123	21	3 42 21.07	2.0864	18 17 31.3	9.689
22	2 6 35.87	1.9986	9 15 1.7	13.072	22	3 44 26.32	2.0886	18 27 9.8	9.596
23	2 8 35.82	1.9997	N. 9° 28' 4.5"	13.022	23	3 46 31.71	2.0910	N. 18° 36' 42.7"	9.503
MONDAY 6.					WEDNESDAY 8.				
0	2 10 35.83	2.0007	N. 9° 41' 4.3"	12.970	0	3 48 37.25	2.0934	N. 18° 46' 10.1"	9.410
1	2 12 35.91	2.0019	9 54 0.9	12.916	1	3 50 42.93	2.0958	18 55 31.8	9.315
2	2 14 36.06	2.0032	10 6 54.2	12.862	2	3 52 48.75	2.0981	19 4 47.8	9.220
3	2 16 36.29	2.0044	10 19 44.3	12.808	3	3 54 54.71	2.1005	19 13 58.1	9.124
4	2 18 36.59	2.0056	10 32 31.1	12.752	4	3 57 0.81	2.1029	19 23 2.6	9.027
5	2 20 36.97	2.0070	10 45 14.5	12.695	5	3 59 7.06	2.1053	19 32 1.3	8.930
6	2 22 37.43	2.0083	10 57 54.5	12.638	6	4 1 13.45	2.1076	19 40 54.2	8.832
7	2 24 37.97	2.0098	11 10 31.0	12.579	7	4 3 19.98	2.1100	19 49 41.2	8.733
8	2 26 38.60	2.0113	11 23 3.9	12.519	8	4 5 26.65	2.1123	19 58 22.2	8.633
9	2 28 39.33	2.0129	11 35 33.2	12.459	9	4 7 33.46	2.1146	20 6 57.2	8.533
10	2 30 40.15	2.0144	11 47 58.9	12.397	10	4 9 40.41	2.1169	20 15 26.2	8.433
11	2 32 41.06	2.0159	12 0 20.8	12.335	11	4 11 47.50	2.1192	20 23 49.1	8.331
12	2 34 42.06	2.0175	12 12 39.0	12.271	12	4 13 54.72	2.1215	20 32 5.9	8.229
13	2 36 43.16	2.0191	12 24 53.3	12.207	13	4 16 2.08	2.1238	20 40 16.6	8.126
14	2 38 44.36	2.0209	12 37 3.7	12.142	14	4 18 9.58	2.1261	20 48 21.1	8.022
15	2 40 45.67	2.0226	12 49 10.3	12.076	15	4 20 17.22	2.1284	20 56 19.3	7.919
16	2 42 47.08	2.0244	13 1 12.9	12.008	16	4 22 24.99	2.1306	21 4 11.3	7.815
17	2 44 48.60	2.0263	13 13 11.3	11.940	17	4 24 32.89	2.1328	21 11 57.0	7.710
18	2 46 50.23	2.0281	13 25 5.6	11.871	18	4 26 40.93	2.1350	21 19 36.4	7.604
19	2 48 51.97	2.0299	13 36 55.8	11.801	19	4 28 49.10	2.1372	21 27 9.4	7.497
20	2 50 53.82	2.0318	13 48 41.8	11.731	20	4 30 57.40	2.1394	21 34 36.0	7.389
21	2 52 55.79	2.0337	14 0 23.5	11.659	21	4 33 5.83	2.1416	21 41 56.1	7.282
22	2 54 57.87	2.0357	14 12 0.9	11.587	22	4 35 14.39	2.1437	21 49 9.8	7.174
23	2 57 0.07	2.0377	14 23 33.9	11.515	23	4 37 23.07	2.1458	21 56 17.0	7.065
24	2 59 2.39	2.0397	N. 14° 35' 2.6"	11.441	24	4 39 31.88	2.1478	N. 22° 3' 17.6"	6.955

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
THURSDAY 9.					SATURDAY 11.				
0	h m s	"	N. 22° 3' 17.6"	6.955	0	h m s	"	N. 25° 23' 11.3"	1.263
1	4 39 31.88	2.1478	22 10 11.6	6.845	1	6 24 18.77	2.9001	25 24 23.5	1.140
2	4 41 40.81	2.1498	22 16 59.0	6.735	2	6 26 30.77	2.1999	25 25 28.3	1.018
3	4 43 49.86	2.1519	22 23 39.9	6.625	3	6 28 42.76	2.1997	25 26 25.7	0.895
4	4 45 59.04	2.1539	22 30 14.1	6.514	4	6 30 54.73	2.1994	25 27 15.7	0.772
5	4 48 8.34	2.1559	22 36 41.5	6.401	5	6 33 6.69	2.1991	25 27 58.3	0.650
6	4 50 17.75	2.1578	22 43 2.1	6.288	6	6 35 18.62	2.1987	25 28 33.6	0.527
7	4 52 27.27	2.1597	22 49 16.0	6.175	7	6 37 30.53	2.1983	25 29 1.5	0.404
8	4 54 36.91	2.1616	22 55 23.1	6.062	8	6 39 42.41	2.1978	25 29 22.0	0.280
9	4 56 46.66	2.1634	23 1 23.4	5.949	9	6 41 54.26	2.1973	25 29 35.1	0.157
10	4 58 56.52	2.1652	23 7 16.9	5.835	10	6 44 6.07	2.1968	25 29 40.9	+0.035
11	5 1 6.49	2.1670	23 13 3.5	5.720	11	6 46 17.84	2.1960	25 29 30.4	-0.087
12	5 3 16.56	2.1687	23 18 43.2	5.605	12	6 48 29.57	2.1953	25 29 30.5	0.309
13	5 5 26.73	2.1704	23 24 16.0	5.489	13	6 50 41.27	2.1946	25 29 14.3	0.331
14	5 7 37.01	2.1720	23 29 41.8	5.372	14	6 52 52.92	2.1937	25 28 50.8	0.453
15	5 9 47.38	2.1737	23 35 0.6	5.255	15	6 55 4.51	2.1927	25 28 19.9	0.576
16	5 11 57.85	2.1753	23 40 12.4	5.139	16	6 57 16.03	2.1917	25 27 41.7	0.698
17	5 14 8.41	2.1768	23 45 17.2	5.022	17	6 59 27.50	2.1907	25 26 56.2	0.819
18	5 16 19.06	2.1783	23 50 15.1	4.905	18	7 1 38.91	2.1897	25 26 3.5	0.940
19	5 18 29.80	2.1798	23 55 5.9	4.787	19	7 3 50.26	2.1886	25 25 3.5	1.061
20	5 20 40.63	2.1812	23 59 49.5	4.668	20	7 6 1.54	2.1874	25 23 56.2	1.182
21	5 22 51.54	2.1825	24 4 26.0	4.549	21	7 8 12.75	2.1862	25 22 41.6	1.303
22	5 25 2.53	2.1838	24 8 55.4	4.430	22	7 10 23.88	2.1849	25 21 19.8	1.423
23	5 27 13.60	2.1850	N. 24 13 17.6	4.311	23	7 12 34.93	2.1836	N. 25 19 50.8	1.543
24	5 29 24.74	2.1862				7 14 45.90	2.1823		
FRIDAY 10.					SUNDAY 12.				
0	5 31 35.95	2.1874	24 21 40.6	4.192	0	7 16 56.80	2.1810	N. 25 18 14.7	1.663
1	5 33 47.23	2.1886	24 25 41.3	3.952	1	7 19 7.61	2.1795	25 16 31.3	1.783
2	5 35 58.58	2.1898	24 29 34.8	3.832	2	7 21 18.33	2.1779	25 14 40.7	1.903
3	5 38 10.00	2.1908	24 33 21.1	3.711	3	7 23 28.95	2.1763	25 12 43.0	2.021
4	5 40 21.48	2.1918	24 37 0.1	3.590	4	7 25 39.48	2.1747	25 10 38.2	2.139
5	5 42 33.01	2.1927	24 40 31.9	3.469	5	7 27 49.91	2.1731	25 8 26.2	2.258
6	5 44 44.60	2.1936	24 43 56.4	3.348	6	7 30 0.25	2.1714	25 6 7.1	2.377
7	5 46 56.24	2.1944	24 47 13.6	3.227	7	7 32 10.49	2.1697	25 3 40.9	2.496
8	5 49 7.92	2.1952	24 50 23.6	3.106	8	7 34 20.62	2.1679	24 58 27.3	2.614
9	5 51 19.65	2.1959	24 53 26.3	2.983	9	7 36 30.63	2.1661	24 55 40.0	2.731
10	5 53 31.42	2.1965	24 56 21.6	2.860	10	7 38 40.54	2.1642	24 52 45.7	2.848
11	5 55 43.23	2.1972	24 59 9.5	2.738	11	7 40 50.34	2.1624	24 49 44.3	2.965
12	5 57 55.08	2.1978	25 1 50.1	2.616	12	7 43 0.03	2.1605	24 46 36.0	3.081
13	6 0 6.96	2.1983	25 4 23.4	2.494	13	7 45 9.60	2.1585	24 43 20.8	3.197
14	6 2 18.87	2.1987	25 6 49.4	2.372	14	7 47 19.05	2.1564	24 39 58.6	3.312
15	6 4 30.80	2.1990	25 9 8.0	2.249	15	7 49 28.37	2.1543	24 36 29.5	3.427
16	6 6 42.75	2.1994	25 11 19.2	2.126	16	7 51 37.57	2.1523	24 32 53.6	3.542
17	6 8 54.72	2.1997	25 13 23.1	2.003	17	7 53 46.64	2.1502	24 29 10.8	3.656
18	6 11 6.71	2.1999	25 15 19.6	1.880	18	7 55 55.59	2.1481	24 25 21.2	3.770
19	6 13 18.71	2.2001	25 17 8.7	1.757	19	7 58 4.41	2.1459	24 21 24.8	3.884
20	6 15 30.72	2.2002	25 18 50.4	1.634	20	8 0 13.09	2.1436	24 17 21.6	3.997
21	6 17 42.73	2.2003	25 20 24.8	1.511	21	8 2 21.64	2.1414	24 13 11.6	4.110
22	6 19 54.75	2.2002	25 21 51.8	1.387	22	8 4 30.06	2.1391	24 8 54.9	4.223
23	6 22 6.76	2.2002	N. 25 23 11.3	1.263	23	8 6 38.34	2.1368	N. 24 4 31.6	4.334
24	6 24 18.77	2.2001			24	8 8 46.47	2.1345		4.444

## GREENWICH MEAN TIME

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
MONDAY 13.					WEDNESDAY 15.				
0	8 <sup>h</sup> 8 <sup>m</sup> 46.47	2.1345	N.24° 4' 31".6	4.444	0	9 <sup>h</sup> 48 <sup>m</sup> 16.85	2.0117	N.18° 32' 10".6	9.196
1	8 10 54.46	2.1322	24 0 1.6	4.556	1	9 50 17.48	2.0093	18 22 56.3	9.281
2	8 13 2.31	2.1299	23 55 24.9	4.668	2	9 52 17.97	2.0069	18 13 36.9	9.366
3	8 15 10.03	2.1275	23 50 41.5	4.778	3	9 54 18.32	2.0046	18 4 12.4	9.450
4	8 17 17.60	2.1250	23 45 51.5	4.887	4	9 56 18.53	2.0023	17 54 42.9	9.533
5	8 19 25.02	2.1225	23 40 55.0	4.995	5	9 58 18.61	2.0001	17 45 8.4	9.615
6	8 21 32.29	2.1200	23 35 52.1	5.103	6	10 0 18.55	1.9979	17 35 29.0	9.697
7	8 23 39.41	2.1175	23 30 42.6	5.212	7	10 2 18.36	1.9957	17 25 44.7	9.779
8	8 25 46.38	2.1150	23 25 26.6	5.321	8	10 4 18.04	1.9937	17 15 55.5	9.862
9	8 27 53.20	2.1125	23 20 4.1	5.429	9	10 6 17.60	1.9916	17 6 1.3	9.943
10	8 29 59.87	2.1099	23 14 35.2	5.535	10	10 8 17.03	1.9895	16 56 2.3	10.023
11	8 32 6.38	2.1073	23 9 0.0	5.640	11	10 10 16.34	1.9875	16 45 58.6	10.101
12	8 34 12.74	2.1047	23 3 18.4	5.746	12	10 12 15.53	1.9855	16 35 50.3	10.179
13	8 36 18.94	2.1021	22 57 30.4	5.852	13	10 14 14.60	1.9835	16 25 37.2	10.257
14	8 38 24.99	2.0995	22 51 36.1	5.956	14	10 16 13.55	1.9815	16 15 19.4	10.335
15	8 40 30.88	2.0969	22 45 35.6	6.060	15	10 18 12.38	1.9796	16 4 57.0	10.412
16	8 42 36.61	2.0943	22 39 28.8	6.165	16	10 20 11.10	1.9777	15 54 30.0	10.488
17	8 44 42.19	2.0917	22 33 15.8	6.268	17	10 22 9.71	1.9759	15 43 58.4	10.563
18	8 46 47.61	2.0890	22 26 56.6	6.371	18	10 24 8.21	1.9741	15 33 22.3	10.639
19	8 48 52.87	2.0864	22 20 31.3	6.473	19	10 26 6.60	1.9723	15 22 41.7	10.714
20	8 50 57.97	2.0837	22 13 59.9	6.575	20	10 28 4.89	1.9707	15 11 56.7	10.788
21	8 53 2.91	2.0810	22 7 22.4	6.676	21	10 30 3.09	1.9691	15 1 7.2	10.861
22	8 55 7.69	2.0784	22 0 38.9	6.777	22	10 32 1.19	1.9675	14 50 13.4	10.933
23	8 57 12.31	2.0758	N.21 53 49.3	6.877	23	10 33 59.19	1.9658	N.14 39 15.3	11.005
TUESDAY 14.					THURSDAY 16.				
0	8 59 16.78	2.0731	N.21 46 53.7	6.977	0	10 35 57.09	1.9642	N.14 28 12.8	11.077
1	9 1 21.09	2.0704	21 39 52.1	7.076	1	10 37 54.90	1.9626	14 17 6.0	11.147
2	9 3 25.23	2.0677	21 32 44.6	7.174	2	10 39 52.63	1.9614	14 5 55.1	11.217
3	9 5 29.21	2.0650	21 25 31.3	7.271	3	10 41 50.27	1.9600	13 54 40.0	11.287
4	9 7 33.03	2.0624	21 18 12.1	7.369	4	10 43 47.83	1.9586	13 43 20.7	11.357
5	9 9 36.69	2.0598	21 10 47.1	7.465	5	10 45 45.31	1.9572	13 31 57.3	11.425
6	9 11 40.20	2.0572	21 3 16.3	7.561	6	10 47 42.70	1.9559	13 20 29.9	11.491
7	9 13 43.55	2.0545	20 55 39.7	7.657	7	10 49 40.02	1.9548	13 8 58.4	11.558
8	9 15 46.74	2.0519	20 47 57.4	7.751	8	10 51 37.27	1.9537	12 57 22.9	11.624
9	9 17 49.77	2.0492	20 40 9.5	7.845	9	10 53 34.46	1.9526	12 45 43.5	11.690
10	9 19 52.64	2.0466	20 32 15.9	7.940	10	10 55 31.58	1.9515	12 34 0.2	11.755
11	9 21 55.36	2.0440	20 24 16.7	8.034	11	10 57 28.64	1.9505	12 22 13.0	11.820
12	9 23 57.92	2.0415	20 16 11.8	8.128	12	10 59 25.64	1.9495	12 10 21.9	11.884
13	9 26 0.33	2.0389	20 8 1.4	8.220	13	11 1 22.58	1.9486	11 58 27.0	11.946
14	9 28 2.58	2.0363	19 59 45.5	8.311	14	11 3 19.47	1.9477	11 46 28.4	12.006
15	9 30 4.68	2.0338	19 51 24.1	8.402	15	11 5 16.31	1.9469	11 34 26.1	12.069
16	9 32 6.63	2.0313	19 42 57.2	8.493	16	11 7 13.10	1.9461	11 22 20.1	12.130
17	9 34 8.43	2.0287	19 34 25.0	8.583	17	11 9 9.85	1.9455	11 10 10.4	12.191
18	9 36 10.07	2.0262	19 25 47.4	8.672	18	11 11 6.57	1.9449	10 57 57.1	12.252
19	9 38 11.56	2.0237	19 17 4.4	8.761	19	11 13 3.25	1.9443	10 45 40.2	12.311
20	9 40 12.91	2.0213	19 8 16.1	8.848	20	11 14 59.89	1.9437	10 33 19.8	12.368
21	9 42 14.11	2.0188	18 59 22.6	8.936	21	11 16 56.50	1.9432	10 20 56.0	12.426
22	9 44 15.16	2.0164	18 50 23.8	9.024	22	11 18 53.08	1.9428	10 8 28.7	12.483
23	9 46 16.07	2.0141	18 41 19.8	9.110	23	11 20 49.64	1.9426	9 55 58.0	12.539
24	9 48 16.85	2.0117	N.18 32 10.6	9.196	24	11 22 46.19	1.9423	N. 9 43 24.0	12.595



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
FRIDAY 17.					SUNDAY 19.				
0	11 22 46.19	1.9423	N. 9 43' 24.0"	12.585	0	12 56 52.60	2.0054	S. 1 10' 39.0"	14.329
1	11 24 42.72	1.9420	9 30 46.6	12.650	1	12 58 53.01	2.0084	1 24 59.1	14.342
2	11 26 39.24	1.9418	9 18 6.0	12.704	2	13 0 53.61	2.0116	1 39 20.0	14.353
3	11 28 35.74	1.9417	9 5 22.1	12.758	3	13 2 54.40	2.0148	1 53 41.5	14.364
4	11 30 32.24	1.9417	8 52 35.0	12.811	4	13 4 55.39	2.0181	2 8 3.7	14.375
5	11 32 28.74	1.9417	8 39 44.8	12.862	5	13 6 56.58	2.0214	2 22 26.4	14.384
6	11 34 25.24	1.9417	8 26 51.6	12.912	6	13 8 57.96	2.0248	2 36 49.7	14.392
7	11 36 21.75	1.9419	8 13 55.3	12.963	7	13 10 59.55	2.0283	2 51 13.4	14.398
8	11 38 18.27	1.9420	8 0 56.0	13.014	8	13 13 1.36	2.0319	3 5 37.4	14.403
9	11 40 14.79	1.9421	7 47 53.6	13.064	9	13 15 3.39	2.0356	3 20 1.7	14.407
10	11 42 11.33	1.9425	7 34 48.3	13.112	10	13 17 5.64	2.0394	3 34 26.2	14.410
11	11 44 7.90	1.9429	7 21 40.2	13.159	11	13 19 8.12	2.0432	3 48 50.9	14.412
12	11 46 4.50	1.9434	7 8 29.2	13.206	12	13 21 10.83	2.0470	4 3 15.7	14.413
13	11 48 1.12	1.9439	6 55 15.4	13.253	13	13 23 13.77	2.0510	4 17 40.5	14.412
14	11 49 57.77	1.9445	6 41 58.9	13.298	14	13 25 16.96	2.0551	4 32 5.1	14.409
15	11 51 54.46	1.9452	6 28 39.7	13.343	15	13 27 20.39	2.0593	4 46 29.6	14.406
16	11 53 51.19	1.9459	6 15 17.8	13.386	16	13 29 24.07	2.0635	5 0 53.9	14.401
17	11 55 47.97	1.9466	6 1 53.3	13.428	17	13 31 28.01	2.0677	5 15 17.8	14.395
18	11 57 44.79	1.9474	5 48 26.3	13.471	18	13 33 32.20	2.0720	5 29 41.3	14.388
19	11 59 41.66	1.9483	5 34 56.8	13.513	19	13 35 36.66	2.0765	5 44 4.4	14.380
20	12 1 38.59	1.9494	5 21 24.8	13.554	20	13 37 41.39	2.0810	5 58 26.9	14.370
21	12 3 35.59	1.9505	5 7 50.3	13.594	21	13 39 46.38	2.0855	6 12 48.8	14.359
22	12 5 32.65	1.9516	4 54 13.5	13.632	22	13 41 51.65	2.0902	6 27 10.0	14.346
23	12 7 29.78	1.9527	N. 4 40 34.4	13.670	23	13 43 57.21	2.0950	S. 6 41 30.4	14.332
SATURDAY 18.					MONDAY 20.				
0	12 9 26.97	1.9539	N. 4 26 53.1	13.707	0	13 46 3.05	2.0998	S. 6 55 49.9	14.317
1	12 11 24.24	1.9552	4 13 9.6	13.744	1	13 48 9.18	2.1047	7 10 8.5	14.301
2	12 13 21.60	1.9566	3 59 23.9	13.780	2	13 50 15.61	2.1096	7 24 26.0	14.283
3	12 15 19.04	1.9580	3 45 36.0	13.815	3	13 52 22.33	2.1145	7 38 42.4	14.263
4	12 17 16.57	1.9596	3 31 46.1	13.849	4	13 54 29.35	2.1196	7 52 57.5	14.241
5	12 19 14.20	1.9612	3 17 54.2	13.882	5	13 56 36.68	2.1248	8 7 11.3	14.219
6	12 21 11.92	1.9628	3 4 0.3	13.914	6	13 58 44.33	2.1301	8 21 23.8	14.195
7	12 23 9.74	1.9645	2 50 4.5	13.945	7	14 0 52.29	2.1353	8 35 34.8	14.169
8	12 25 7.67	1.9663	2 36 6.9	13.975	8	14 3 0.57	2.1406	8 49 44.1	14.141
9	12 27 5.71	1.9682	2 22 7.5	14.004	9	14 5 9.17	2.1460	9 3 51.8	14.113
10	12 29 3.86	1.9702	2 8 6.4	14.032	10	14 7 18.10	2.1515	9 17 57.7	14.083
11	12 31 2.14	1.9723	1 54 3.6	14.060	11	14 9 27.36	2.1571	9 32 1.8	14.052
12	12 33 0.54	1.9744	1 39 59.2	14.087	12	14 11 36.96	2.1628	9 46 4.0	14.019
13	12 34 59.07	1.9766	1 25 53.2	14.112	13	14 13 46.90	2.1686	10 0 4.1	13.985
14	12 36 57.73	1.9788	1 11 45.7	14.136	14	14 15 57.19	2.1743	10 14 2.1	13.948
15	12 38 56.52	1.9811	0 57 36.8	14.160	15	14 18 7.82	2.1801	10 27 57.8	13.910
16	12 40 55.46	1.9835	0 43 26.5	14.183	16	14 20 18.80	2.1860	10 41 51.2	13.870
17	12 42 54.55	1.9860	0 29 14.8	14.206	17	14 22 30.14	2.1920	10 55 42.2	13.828
18	12 44 53.78	1.9885	0 15 1.8	14.227	18	14 24 41.84	2.1980	11 9 30.6	13.785
19	12 46 53.17	1.9911	N. 0 0 47.6	14.246	19	14 26 53.90	2.2041	11 23 16.4	13.741
20	12 48 52.72	1.9938	S. 0 13 27.7	14.264	20	14 29 6.33	2.2102	11 36 59.5	13.695
21	12 50 52.43	1.9966	0 27 44.0	14.281	21	14 31 19.13	2.2164	11 50 39.8	13.647
22	12 52 52.31	1.9995	0 42 1.4	14.298	22	14 33 32.30	2.2227	12 4 17.1	13.597
23	12 54 52.37	2.0024	0 56 19.7	14.314	23	14 35 45.85	2.2290	12 17 51.3	13.546
24	12 56 52.60	2.0054	S. 1 10 39.0	14.329	24	14 37 59.78	2.2353	S. 12 31 22.5	13.493

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
TUESDAY 21.					THURSDAY 23.				
0	14 37 59.78	2.9353	S. 12° 31' 22.5"	13.493	0	16 33 14.87	2.5681	S. 21° 42' 35.7"	8.745
1	14 40 14.09	2.9418	12 44 50.4	13.438	1	16 35 49.15	2.5745	21 51 16.1	8.600
2	14 42 28.79	2.9483	12 58 15.0	13.381	2	16 38 23.81	2.5809	21 59 47.8	8.454
3	14 44 43.89	2.9549	13 11 36.1	13.322	3	16 40 58.85	2.5872	22 8 10.7	8.308
4	14 46 59.38	2.9614	13 24 53.6	13.262	4	16 43 34.26	2.5934	22 16 24.6	8.158
5	14 49 15.26	2.9679	13 38 7.5	13.200	5	16 46 10.05	2.5996	22 24 29.4	8.004
6	14 51 31.53	2.9745	13 51 17.6	13.136	6	16 48 46.20	2.6056	22 32 25.1	7.851
7	14 53 48.20	2.9813	14 4 23.9	13.070	7	16 51 22.71	2.6114	22 40 11.6	7.697
8	14 56 5.28	2.9881	14 17 26.1	13.002	8	16 53 59.57	2.6172	22 47 48.7	7.540
9	14 58 22.78	2.9949	14 30 24.1	12.932	9	16 56 36.77	2.6229	22 55 16.3	7.381
10	15 0 40.68	2.3017	14 43 17.9	12.862	10	16 59 14.31	2.6285	23 2 34.4	7.222
11	15 2 58.99	2.3086	14 56 7.5	12.790	11	17 1 52.19	2.6341	23 9 42.9	7.063
12	15 5 17.72	2.3154	15 8 52.7	12.716	12	17 4 30.40	2.6395	23 16 41.8	6.900
13	15 7 36.86	2.3225	15 21 33.4	12.639	13	17 7 8.93	2.6448	23 23 30.9	6.735
14	15 9 56.42	2.3295	15 34 9.3	12.558	14	17 9 47.77	2.6499	23 30 10.0	6.568
15	15 12 16.40	2.3365	15 46 40.4	12.477	15	17 12 26.92	2.6550	23 36 39.0	6.400
16	15 14 36.80	2.3435	15 59 6.6	12.395	16	17 15 6.37	2.6599	23 42 58.0	6.233
17	15 16 57.62	2.3506	16 11 27.8	12.312	17	17 17 46.11	2.6648	23 49 7.0	6.065
18	15 19 18.87	2.3577	16 23 44.0	12.228	18	17 20 26.14	2.6695	23 55 5.8	5.894
19	15 21 40.54	2.3648	16 35 55.0	12.138	19	17 23 6.44	2.6740	24 0 54.2	5.721
20	15 24 2.64	2.3719	16 48 0.5	12.046	20	17 25 47.01	2.6784	24 6 32.2	5.549
21	15 26 25.18	2.3790	17 0 0.5	11.954	21	17 28 27.84	2.6826	24 11 59.9	5.375
22	15 28 48.14	2.3862	17 11 55.0	11.861	22	17 31 8.92	2.6868	24 17 17.1	5.199
23	15 31 11.53	2.3934	S. 17° 23' 43.8"	11.765	23	17 33 50.25	2.6908	S. 24° 22' 23.6"	5.021
WEDNESDAY 22.					FRIDAY 24.				
0	15 33 35.35	2.4006	S. 17° 35' 26.8"	11.667	0	17 36 31.81	2.6946	S. 24° 27' 19.5"	4.843
1	15 35 59.60	2.4078	17 47 3.9	11.568	1	17 39 13.60	2.6982	24 32 4.7	4.663
2	15 38 24.28	2.4150	17 58 34.9	11.466	2	17 41 55.60	2.7017	24 36 39.1	4.483
3	15 40 49.40	2.4222	18 9 59.8	11.363	3	17 44 37.80	2.7050	24 41 2.7	4.303
4	15 43 14.95	2.4294	18 21 18.4	11.257	4	17 47 20.20	2.7082	24 45 15.4	4.121
5	15 45 40.93	2.4365	18 32 30.6	11.150	5	17 50 2.79	2.7113	24 49 17.1	3.938
6	15 48 7.33	2.4437	18 43 36.4	11.041	6	17 52 45.56	2.7142	24 53 7.9	3.755
7	15 50 34.16	2.4509	18 54 35.6	10.930	7	17 55 28.49	2.7169	24 56 47.6	3.570
8	15 53 1.43	2.4581	19 5 27.9	10.816	8	17 58 11.58	2.7195	25 0 16.2	3.385
9	15 55 29.13	2.4653	19 16 13.3	10.700	9	18 0 54.83	2.7219	25 3 33.8	3.200
10	15 57 57.26	2.4723	19 26 51.8	10.583	10	18 3 38.21	2.7240	25 6 40.2	3.013
11	16 0 25.81	2.4794	19 37 23.2	10.464	11	18 6 21.71	2.7260	25 9 35.4	2.826
12	16 2 54.79	2.4865	19 47 47.5	10.343	12	18 9 5.33	2.7279	25 12 19.3	2.639
13	16 5 24.19	2.4935	19 58 4.4	10.220	13	18 11 49.05	2.7295	25 14 52.0	2.450
14	16 7 54.01	2.5006	20 8 13.9	10.096	14	18 14 32.87	2.7310	25 17 13.4	2.261
15	16 10 24.26	2.5076	20 18 15.9	9.969	15	18 17 16.78	2.7324	25 19 23.4	2.072
16	16 12 54.92	2.5145	20 28 10.2	9.840	16	18 20 0.76	2.7335	25 21 22.1	1.883
17	16 15 25.99	2.5213	20 37 56.7	9.710	17	18 22 44.80	2.7345	25 23 9.4	1.694
18	16 17 57.48	2.5282	20 47 35.4	9.578	18	18 25 28.90	2.7353	25 24 45.4	1.505
19	16 20 29.38	2.5350	20 57 6.1	9.444	19	18 28 13.04	2.7359	25 26 10.0	1.315
20	16 23 1.68	2.5417	21 6 28.6	9.308	20	18 30 57.20	2.7363	25 27 23.2	1.124
21	16 25 34.38	2.5484	21 15 43.0	9.171	21	18 33 41.39	2.7366	25 28 24.9	0.933
22	16 28 7.48	2.5550	21 24 49.1	9.031	22	18 36 25.59	2.7368	25 29 15.2	0.743
23	16 30 40.96	2.5616	21 33 46.7	8.889	23	18 39 9.78	2.7364	25 29 54.1	0.553
24	16 33 14.87	2.5681	S. 21° 42' 35.7"	8.745	24	18 41 53.96	2.7361	S. 25° 30' 21.6"	0.363

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SATURDAY 25.					MONDAY 27.				
0	18 41 53.96	2.7361	S. 25° 30' 21.6"	0.363	0	20 49 43.99	2.5387	S. 22° 19' 13.6"	7.997
1	18 44 38.11	2.7356	25 30 37.7	-0.173	1	20 52 16.11	2.5319	22 11 13.7	8.068
2	18 47 22.23	2.7349	25 30 42.3	+0.018	2	20 54 47.82	2.5250	22 3 5.4	8.208
3	18 50 6.31	2.7341	25 30 35.4	0.209	3	20 57 19.11	2.5181	21 54 48.7	8.346
4	18 52 50.33	2.7331	25 30 17.2	0.400	4	20 59 49.99	2.5112	21 46 23.8	8.483
5	18 55 34.27	2.7319	25 29 47.6	0.589	5	21 2 20.46	2.5043	21 37 50.8	8.618
6	18 58 18.14	2.7305	25 29 6.7	0.778	6	21 4 50.51	2.4974	21 29 9.7	8.751
7	19 1 1.92	2.7289	25 28 14.4	0.966	7	21 7 20.14	2.4904	21 20 20.7	8.882
8	19 3 45.60	2.7271	25 27 10.8	1.155	8	21 9 49.35	2.4833	21 11 23.9	9.011
9	19 6 29.17	2.7251	25 25 55.8	1.344	9	21 12 18.14	2.4762	21 2 19.4	9.138
10	19 9 12.62	2.7229	25 24 29.5	1.532	10	21 14 46.50	2.4691	20 53 7.3	9.265
11	19 11 55.93	2.7207	25 22 52.0	1.719	11	21 17 14.44	2.4620	20 43 47.7	9.390
12	19 14 39.10	2.7183	25 21 3.3	1.905	12	21 19 41.95	2.4549	20 34 20.5	9.513
13	19 17 22.12	2.7157	25 19 3.4	2.091	13	21 22 9.03	2.4478	20 24 46.1	9.633
14	19 20 4.98	2.7129	25 16 52.4	2.277	14	21 24 35.68	2.4406	20 15 4.5	9.752
15	19 22 47.66	2.7099	25 14 30.2	2.461	15	21 27 1.90	2.4334	20 5 15.8	9.869
16	19 25 30.16	2.7068	25 11 57.0	2.644	16	21 29 27.69	2.4263	19 55 20.1	9.985
17	19 28 12.47	2.7035	25 9 12.9	2.827	17	21 31 53.05	2.4191	19 45 17.5	10.099
18	19 30 54.58	2.7001	25 6 17.8	3.009	18	21 34 17.98	2.4119	19 35 8.1	10.212
19	19 33 36.48	2.6965	25 3 11.8	3.191	19	21 36 42.48	2.4048	19 24 52.0	10.323
20	19 36 18.16	2.6928	24 59 54.9	3.373	20	21 39 6.55	2.3977	19 14 29.3	10.432
21	19 38 59.61	2.6889	24 56 27.2	3.551	21	21 41 30.20	2.3906	19 4 0.2	10.539
22	19 41 40.82	2.6848	24 52 48.8	3.729	22	21 43 53.42	2.3834	18 53 24.7	10.645
23	19 44 21.79	2.6807	S. 24 48 59.7	3.907	23	21 46 16.21	2.3762	S. 18 42 42.9	10.750
SUNDAY 26.					TUESDAY 28.				
0	19 47 2.50	2.6764	S. 24 44 59.9	4.084	0	21 48 38.56	2.3691	S. 18 31 54.8	10.852
1	19 49 42.95	2.6719	24 40 49.6	4.259	1	21 51 0.49	2.3620	18 21 0.7	10.951
2	19 52 23.12	2.6672	24 36 28.8	4.433	2	21 53 22.00	2.3550	18 10 0.7	11.049
3	19 55 3.01	2.6624	24 31 57.6	4.606	3	21 55 43.09	2.3480	17 58 54.8	11.146
4	19 57 42.61	2.6576	24 27 16.1	4.778	4	21 58 3.76	2.3410	17 47 43.2	11.241
5	20 0 21.92	2.6527	24 22 24.2	4.950	5	22 0 24.01	2.3339	17 36 25.9	11.335
6	20 3 0.93	2.6476	24 17 22.1	5.120	6	22 2 43.83	2.3269	17 25 3.0	11.427
7	20 5 39.63	2.6424	24 12 9.8	5.288	7	22 5 3.23	2.3200	17 13 34.7	11.517
8	20 8 18.01	2.6370	24 6 47.6	5.454	8	22 7 22.23	2.3132	17 2 1.0	11.606
9	20 10 56.06	2.6315	24 1 15.4	5.619	9	22 9 40.82	2.3064	16 50 22.0	11.693
10	20 13 33.78	2.6260	23 55 33.3	5.783	10	22 11 59.00	2.2996	16 38 37.9	11.778
11	20 16 11.17	2.6204	23 49 41.4	5.945	11	22 14 16.77	2.2928	16 26 48.8	11.861
12	20 18 48.22	2.6146	23 43 39.8	6.107	12	22 16 34.13	2.2860	16 14 54.6	11.944
13	20 21 24.92	2.6087	23 37 28.5	6.268	13	22 18 51.09	2.2794	16 2 55.5	12.024
14	20 24 1.26	2.6026	23 31 7.7	6.427	14	22 21 7.65	2.2728	15 50 51.7	12.102
15	20 26 37.23	2.5965	23 24 37.4	6.584	15	22 23 23.82	2.2663	15 38 43.3	12.179
16	20 29 12.84	2.5904	23 17 57.7	6.739	16	22 25 39.60	2.2596	15 26 30.3	12.254
17	20 31 48.08	2.5842	23 11 8.7	6.893	17	22 27 54.99	2.2532	15 14 12.8	12.328
18	20 34 22.94	2.5779	23 4 10.5	7.046	18	22 30 9.98	2.2467	15 1 50.9	12.400
19	20 36 57.42	2.5715	22 57 3.2	7.197	19	22 32 24.59	2.2404	14 49 24.7	12.471
20	20 39 31.52	2.5651	22 49 46.9	7.346	20	22 34 38.82	2.2341	14 36 54.4	12.540
21	20 42 5.23	2.5586	22 42 21.7	7.494	21	22 36 52.68	2.2279	14 24 19.9	12.607
22	20 44 38.55	2.5520	22 34 47.7	7.640	22	22 39 6.16	2.2216	14 11 41.4	12.674
23	20 47 11.47	2.5454	22 27 5.0	7.784	23	22 41 19.27	2.2154	13 58 59.1	12.738
24	20 49 43.99	2.5387	S. 22 19 13.6	7.927	24	22 43 32.00	2.2092	S. 13 46 12.9	12.801

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
WEDNESDAY 29.					FRIDAY 31.				
0	<sup>h</sup> 22 <sup>m</sup> 43 <sup>s</sup> 32.00	2.9092	S. 13° 46' 12.9"	12.801	0	<sup>h</sup> 0 <sup>m</sup> 23 <sup>s</sup> 54.10	2.0016	S. 2° 45' 52.8"	14.224
1	22 45 44.37	2.9033	13 33 23.0	12.802	1	0 25 54.13	1.9992	2 31 39.4	14.223
2	22 47 56.39	2.1973	13 20 29.5	12.992	2	0 27 54.01	1.9968	2 17 26.0	14.222
3	22 50 8.06	2.1915	13 7 32.4	12.981	3	0 29 53.76	1.9946	2 3 12.8	14.220
4	22 52 19.37	2.1857	12 54 31.8	13.038	4	0 31 53.37	1.9924	1 48 59.7	14.217
5	22 54 30.33	2.1799	12 41 27.9	13.093	5	0 33 52.85	1.9902	1 34 46.8	14.214
6	22 56 40.95	2.1742	12 28 20.7	13.146	6	0 35 52.20	1.9882	1 20 34.1	14.209
7	22 58 51.23	2.1685	12 15 10.3	13.196	7	0 37 51.43	1.9862	1 6 21.8	14.202
8	23 1 1.17	2.1630	12 1 56.8	13.249	8	0 39 50.55	1.9842	0 52 9.9	14.194
9	23 3 10.78	2.1575	11 48 40.3	13.299	9	0 41 49.55	1.9824	0 37 58.5	14.186
10	23 5 20.06	2.1520	11 35 20.9	13.347	10	0 43 48.44	1.9806	0 23 47.6	14.177
11	23 7 29.02	2.1467	11 21 58.6	13.394	11	0 45 47.23	1.9790	S. 0 9 37.3	14.167
12	23 9 37.66	2.1414	11 8 33.5	13.440	12	0 47 45.93	1.9774	N. 0 4 32.4	14.156
13	23 11 45.98	2.1362	10 55 5.8	13.484	13	0 49 44.53	1.9759	0 18 41.4	14.144
14	23 13 54.00	2.1310	10 41 35.5	13.527	14	0 51 43.04	1.9745	0 32 49.6	14.131
15	23 16 1.71	2.1259	10 28 2.6	13.568	15	0 53 41.47	1.9731	0 46 57.0	14.116
16	23 18 9.11	2.1209	10 14 27.3	13.608	16	0 55 39.81	1.9717	1 1 3.5	14.100
17	23 20 16.22	2.1161	10 0 49.7	13.647	17	0 57 38.08	1.9704	1 15 9.0	14.084
18	23 22 23.04	2.1113	9 47 9.7	13.684	18	0 59 36.27	1.9692	1 29 13.6	14.068
19	23 24 29.57	2.1065	9 33 27.5	13.720	19	1 1 34.39	1.9682	1 43 17.1	14.050
20	23 26 35.82	2.1018	9 19 43.3	13.754	20	1 3 32.45	1.9672	1 57 19.5	14.030
21	23 28 41.78	2.0971	9 5 57.1	13.787	21	1 5 30.46	1.9662	2 11 20.7	14.010
22	23 30 47.47	2.0926	8 52 8.9	13.819	22	1 7 28.41	1.9653	2 25 20.6	13.988
23	23 32 52.89	2.0881	S. 8 38 18.8	13.850	23	1 9 26.31	1.9644	N. 2 39 19.2	13.966
THURSDAY 30.					SATURDAY, JUNE 1.				
0	23 34 58.04	2.0837	S. 8 24 26.9	13.879	0	1 11 24.15	1.9636	N. 2 53 16.6	13.944
1	23 37 2.93	2.0794	8 10 33.3	13.907	PHASES OF THE MOON.				
2	23 39 7.57	2.0752	7 56 38.0	13.934					
3	23 41 11.95	2.0710	7 42 41.2	13.960					
4	23 43 16.09	2.0668	7 28 42.9	13.985					
5	23 45 19.98	2.0628	7 14 43.1	14.008	<div>● New Moon, . . . <sup>d</sup> 7 <sup>h</sup> 1 <sup>m</sup> 18.9</div> <div>☾ First Quarter, . . . 15 4 5.4</div> <div>○ Full Moon, . . . 22 11 8.6</div> <div>☾ Last Quarter, . . . 29 2 12.9</div>				
6	23 47 23.63	2.0589	7 0 42.0	14.029					
7	23 49 27.05	2.0551	6 46 39.6	14.049					
8	23 51 30.25	2.0514	6 32 36.1	14.068					
9	23 53 33.22	2.0476	6 18 31.4	14.087	<div>☾ Perigee, . . . . . <sup>d</sup> 12 <sup>h</sup> 12.2</div> <div>☾ Apogee, . . . . . 24 10.8</div>				
10	23 55 35.97	2.0440	6 4 25.6	14.104					
11	23 57 38.51	2.0404	5 50 18.9	14.120					
12	23 59 40.83	2.0370	5 36 11.2	14.135					
13	0 1 42.95	2.0336	5 22 2.6	14.148					
14	0 3 44.87	2.0304	5 7 53.3	14.160					
15	0 5 46.60	2.0272	4 53 43.4	14.171					
16	0 7 48.14	2.0240	4 39 32.8	14.182					
17	0 9 49.49	2.0209	4 25 21.6	14.191					
18	0 11 50.65	2.0179	4 11 9.9	14.199					
19	0 13 51.64	2.0151	3 56 57.7	14.206					
20	0 15 52.46	2.0123	3 42 45.2	14.211					
21	0 17 53.11	2.0095	3 28 32.4	14.215					
22	0 19 53.60	2.0068	3 14 19.4	14.218					
23	0 21 53.93	2.0042	3 0 6.2	14.221					
24	0 23 54.10	2.0016	S. 2 45 52.8	14.224					

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.		Noon.	P. L. of Diff.	III <sup>h</sup> .	P. L. of Diff.	VI <sup>h</sup> .	P. L. of Diff.	IX <sup>h</sup> .	P. L. of Diff.
1	Antares	W.	78° 7' 30"	2393	79° 51' 15"	2399	81° 34' 51"	2406	83° 18' 17"	2412
	α Aquilæ	W.	42 40 57	4562	43 43 55	4499	44 48 50	4311	45 55 32	4205
	Saturn	W.	35 30 29	2398	37 14 7	2403	38 57 37	2409	40 40 59	2414
	Venus	E.	54 40 35	2782	53 5 43	2789	51 31 1	2797	49 56 29	2805
	Sun	E.	75 0 36	2694	73 23 48	2701	71 47 9	2709	70 10 41	2716
2	Antares	W.	91 53 2	2448	93 35 29	2455	95 17 45	2462	96 59 51	2470
	α Aquilæ	W.	51 51 3	3822	53 5 42	3767	54 21 19	3718	55 37 47	3675
	Saturn	W.	49 15 49	2444	50 58 21	2451	52 40 43	2458	54 22 56	2464
	Venus	E.	42 6 24	2845	40 32 55	2854	38 59 37	2862	37 26 30	2871
	Sun	E.	62 10 49	2754	60 35 21	2763	59 0 4	2770	57 24 57	2779
3	Antares	W.	105 27 40	2508	107 8 42	2517	108 49 32	2525	110 30 11	2533
	Saturn	W.	62 51 38	2499	64 32 52	2507	66 13 56	2514	67 54 50	2521
	α Aquilæ	W.	62 10 25	3514	63 30 34	3499	64 51 7	3472	66 12 2	3455
	Fomalhaut	W.	26 36 48	3464	27 57 52	3371	29 20 42	3291	30 45 4	3294
	Venus	E.	29 43 45	2917	28 11 48	2927	26 40 3	2938	25 8 32	2948
	Sun	E.	49 32 2	2819	47 57 59	2828	46 24 7	2836	44 50 26	2845
4	Saturn	W.	76 16 40	2560	77 56 30	2569	79 36 8	2577	81 15 35	2585
	α Aquilæ	W.	73 0 37	3400	74 22 53	3396	75 45 14	3392	77 7 40	3389
	Fomalhaut	W.	38 2 59	3090	39 32 47	2997	41 3 3	2977	42 33 44	2961
	α Pegasi	W.	28 42 20	5391	29 34 21	5103	30 29 56	4861	31 28 42	4656
	Sun	E.	37 4 55	2891	35 32 24	2901	34 0 6	2910	32 28 0	2920
9	Sun	W.	22 17 24	3996	23 41 38	3305	25 5 44	3319	26 29 42	3319
	Pollux	E.	40 30 57	2939	38 59 27	2949	37 28 10	2958	35 57 5	2969
	Jupiter	E.	42 48 20	2976	41 17 37	2989	39 47 11	3001	38 17 0	3013
	Regulus	E.	76 38 28	2935	75 6 54	2944	73 35 31	2954	72 4 20	2962
10	Sun	W.	33 27 22	3356	34 50 29	3364	36 13 27	3371	37 36 17	3377
	Pollux	E.	28 24 52	3090	26 55 4	3031	25 25 30	3043	23 56 10	3056
	Jupiter	E.	30 49 23	3063	29 20 28	3073	27 51 44	3083	26 23 12	3092
	Regulus	E.	64 31 1	3092	63 0 52	3010	61 30 52	3018	60 1 2	3025
	Spica	E.	118 32 46	3017	117 2 54	3023	115 33 10	3030	114 3 34	3035
11	Sun	W.	44 28 39	3408	45 50 47	3412	47 12 50	3417	48 34 47	3421
	Regulus	E.	52 34 0	3059	51 5 0	3065	49 36 8	3071	48 7 23	3076
	Spica	E.	106 37 20	3063	105 8 25	3067	103 39 35	3073	102 10 51	3076
12	Sun	W.	55 23 29	3438	56 45 2	3441	58 6 32	3444	59 27 59	3445
	Regulus	E.	40 45 13	3101	39 17 5	3105	37 49 2	3110	36 21 5	3114
	Spica	E.	94 48 18	3091	93 19 58	3094	91 51 41	3096	90 23 26	3096
13	Sun	W.	66 15 8	3443	67 36 36	3442	68 58 5	3440	70 19 36	3438
	Regulus	E.	29 2 37	3137	27 35 12	3142	26 7 53	3148	24 40 42	3157
	Spica	E.	83 2 27	3098	81 34 15	3096	80 6 1	3095	78 37 46	3094
14	Sun	W.	77 8 0	3419	78 29 55	3413	79 51 57	3408	81 14 5	3400
	Pollux	W.	19 37 11	3114	21 5 4	3101	22 33 12	3099	24 1 35	3078
	Jupiter	W.	16 32 33	3175	17 59 12	3162	19 26 7	3149	20 53 17	3137
	Spica	E.	71 15 49	3079	69 47 14	3074	68 18 33	3069	66 49 46	3065
	Antares	E.	117 9 40	3071	115 40 55	3066	114 12 4	3060	112 43 5	3054
15	Sun	W.	88 6 46	3361	89 29 47	3352	90 52 58	3342	92 16 21	3332

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.		Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
1	Antares	W.	85° 1' 34"	2419	86° 44' 41"	2426	88° 27' 38"	2433	90° 10' 25"	2441
	α Aquilæ	W.	47 3 53	4111	48 13 44	4027	49 24 57	3950	50 37 26	3883
	Saturn	W.	42 24 14	2419	44 7 21	2426	45 50 19	2432	47 33 8	2438
	Venus	E.	48 22 7	2812	46 47 55	2821	45 13 54	2829	43 40 4	2837
	SUN	E.	68 34 22	2723	66 58 13	2739	65 22 15	2739	63 46 27	2747
2	Antares	W.	98 41 46	2477	100 23 31	2485	102 5 5	2493	103 46 28	2501
	α Aquilæ	W.	56 55 1	3635	58 12 58	3598	59 31 34	3567	60 50 44	3539
	Saturn	W.	56 5 0	2470	57 46 55	2477	59 28 40	2485	61 10 14	2492
	Venus	E.	35 53 34	2880	34 20 49	2889	32 48 16	2898	31 15 54	2908
	SUN	E.	55 50 1	2786	54 15 15	2795	52 40 40	2803	51 6 16	2811
3	Antares	W.	112 10 38	2541	113 50 54	2550	115 30 58	2558	117 10 51	2566
	Saturn	W.	69 35 34	2529	71 16 7	2537	72 56 29	2545	74 36 40	2553
	α Aquilæ	W.	67 33 16	3440	68 54 47	3428	70 16 32	3417	71 38 29	3408
	Fomalhaut	W.	32 10 45	3168	33 37 32	3192	35 5 15	3082	36 33 46	3048
	Venus	E.	23 37 14	2960	22 6 11	2971	20 35 22	2984	19 4 49	2997
	SUN	E.	43 16 57	2854	41 43 39	2863	40 10 33	2872	38 37 38	2881
4	Saturn	W.	82 54 51	2583	84 33 56	2601	86 12 49	2610	87 51 31	2618
	α Aquilæ	W.	78 30 9	3388	79 52 39	3368	81 15 9	3390	82 37 37	3393
	Fomalhaut	W.	44 4 46	2947	45 36 5	2935	47 7 39	2927	48 39 24	2920
	α Pegasi	W.	32 30 19	4479	33 34 30	4385	34 41 0	4192	35 49 34	4077
	SUN	E.	30 56 6	2930	29 24 25	2940	27 52 57	2950	26 21 42	2963
9	SUN	W.	27 53 32	3327	29 17 12	3334	30 40 44	3342	32 4 7	3349
	Pollux	E.	34 26 13	2979	32 55 34	2969	31 25 7	2999	29 54 53	3009
	Jupiter	E.	36 47 3	3094	35 17 20	3034	33 47 49	3043	32 18 30	3053
	Regulus	E.	70 33 19	2970	69 2 29	2979	67 31 50	2986	66 1 20	2995
10	SUN	W.	38 59 0	3384	40 21 35	3390	41 44 3	3396	43 6 24	3401
	Pollux	E.	22 27 6	3069	20 58 18	3063	19 29 48	3099	18 1 37	3116
	Jupiter	E.	24 54 53	3109	23 26 46	3114	21 58 53	3125	20 31 14	3138
	Regulus	E.	58 31 20	3039	57 1 47	3039	55 32 23	3046	54 3 7	3053
	Spica	E.	112 34 5	3042	111 4 44	3047	109 35 29	3052	108 6 21	3058
11	SUN	W.	49 56 40	3425	51 18 28	3429	52 40 12	3432	54 1 52	3435
	Regulus	E.	46 38 44	3062	45 10 12	3067	43 41 46	3092	42 13 27	3096
	Spica	E.	100 42 12	3079	99 13 37	3083	97 45 7	3087	96 16 41	3089
12	SUN	W.	60 49 25	3446	62 10 50	3446	63 32 15	3445	64 53 41	3444
	Regulus	E.	34 53 13	3119	33 25 26	3124	31 57 45	3127	30 30 8	3132
	Spica	E.	88 55 12	3098	87 27 0	3099	85 58 49	3099	84 30 38	3099
13	SUN	W.	71 41 9	3435	73 2 46	3432	74 24 26	3428	75 46 11	3424
	Regulus	E.	23 13 41	3166	21 46 51	3176	20 20 13	3188	18 53 49	3205
	Spica	E.	77 9 29	3091	75 41 9	3089	74 12 46	3087	72 44 20	3082
14	SUN	W.	82 36 21	3394	83 58 44	3387	85 21 15	3379	86 43 56	3371
	Pollux	W.	25 30 12	3067	26 59 2	3056	28 28 5	3047	29 57 20	3036
	Jupiter	W.	22 20 42	3125	23 48 21	3114	25 16 14	3103	26 44 20	3092
	Spica	E.	65 20 53	3059	63 51 53	3053	62 22 46	3047	60 53 31	3040
	Antares	E.	111 13 59	3047	109 44 45	3040	108 15 22	3033	106 45 50	3024
15	SUN	W.	93 39 55	3321	95 3 42	3310	96 27 42	3298	97 51 56	3286

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Diff.	III <sup>h</sup> .	P. L. of Diff.	VI <sup>h</sup> .	P. L. of Diff.	IX <sup>h</sup> .	P. L. of Diff.
15	Pollux W.	31° 26' 48"	3096	32° 56' 29"	3014	34° 26' 24"	3004	35° 56' 32"	2993
	Jupiter W.	28 12 39	3082	29 41 11	3070	31 9 57	3060	32 38 56	3048
	Spica E.	59 24 8	3033	57 54 36	3086	56 24 55	3018	54 55 4	3009
	Antares E.	105 16 7	3016	103 46 14	3008	102 16 11	2998	100 45 56	2989
16	SUN W.	99 16 24	3273	100 41 7	3260	102 6 5	3247	103 31 19	3232
	Pollux W.	43 30 47	2934	45 2 23	2920	46 34 16	2907	48 6 26	2894
	Jupiter W.	40 7 25	2988	41 37 53	2976	43 8 36	2962	44 39 36	2949
	Spica E.	47 23 11	2965	45 52 14	2955	44 21 5	2946	42 49 44	2936
	Antares E.	93 11 30	2935	91 39 55	2923	90 8 5	2909	88 35 58	2897
17	SUN W.	110 41 48	3157	112 8 49	3141	113 36 9	3124	115 3 49	3108
	Pollux W.	55 51 42	2821	57 25 42	2807	59 0 1	2791	60 34 41	2775
	Jupiter W.	52 19 2	2876	53 51 51	2861	55 25 0	2845	56 58 29	2829
	Regulus W.	20 7 8	2998	21 38 54	2986	23 11 18	2969	24 44 17	2943
	Spica E.	35 9 58	2890	33 37 26	2881	32 4 43	2874	30 31 51	2868
	Antares E.	80 51 10	2898	79 17 18	2813	77 43 7	2798	76 8 36	2783
18	SUN W.	122 27 23	3090	123 57 11	3001	125 27 22	2984	126 57 55	2965
	Pollux W.	68 33 18	2699	70 10 8	2678	71 47 20	2659	73 24 55	2642
	Jupiter W.	64 51 11	2747	66 26 49	2729	68 2 50	2712	69 39 14	2695
	Regulus W.	32 36 56	2732	34 12 54	2711	35 49 19	2690	37 26 12	2671
	Antares E.	68 10 58	2704	66 34 23	2687	64 57 26	2671	63 20 7	2654
	Saturn E.	110 30 20	2684	108 53 19	2667	107 15 55	2650	105 38 8	2632
	α Aquilæ E.	112 42 20	2611	111 23 58	2574	110 4 55	2538	108 45 13	2504
19	Pollux W.	81 38 44	2554	83 18 42	2537	84 59 4	2520	86 39 50	2502
	Jupiter W.	77 47 6	2607	79 25 52	2588	81 5 3	2571	82 44 38	2554
	Regulus W.	45 37 12	2573	47 16 44	2554	48 56 42	2537	50 37 4	2519
	Antares E.	55 7 55	2572	53 28 21	2555	51 48 24	2539	50 8 5	2523
	Saturn E.	97 23 17	2545	95 43 7	2527	94 2 32	2510	92 21 33	2493
	α Aquilæ E.	101 57 40	2353	100 34 30	2327	99 10 50	2302	97 46 41	2279
20	Pollux W.	95 9 46	2417	96 52 57	2401	98 36 31	2384	100 20 29	2368
	Jupiter W.	91 8 29	2467	92 50 28	2451	94 32 50	2435	96 15 35	2418
	Regulus W.	59 5 19	2428	60 48 14	2411	62 31 33	2394	64 15 17	2378
	Antares E.	41 41 2	2448	39 58 35	2433	38 15 48	2421	36 32 43	2406
	Saturn E.	83 50 34	2408	82 7 10	2391	80 23 22	2375	78 39 11	2358
	α Aquilæ E.	90 39 28	2179	89 12 54	2163	87 46 0	2148	86 18 49	2136
21	Regulus W.	72 59 44	2299	74 45 45	2285	76 32 7	2270	78 18 50	2258
	Spica W.	19 34 55	2496	21 16 14	2450	22 58 37	2412	24 41 54	2379
	Saturn E.	69 52 35	2283	68 6 11	2270	66 19 27	2256	64 32 22	2243
	α Aquilæ E.	78 59 35	2094	77 31 18	2091	76 2 57	2090	74 34 35	2091
22	Regulus W.	87 17 9	2187	89 5 41	2186	90 54 29	2176	92 43 32	2167
	Spica W.	33 28 37	2361	35 15 34	2244	37 2 56	2229	38 50 41	2214
	Saturn E.	55 32 21	2184	53 43 30	2174	51 54 24	2165	50 5 4	2157
	α Aquilæ E.	67 14 8	2134	65 46 40	2153	64 19 34	2173	62 52 53	2196
	Fomalhaut E.	96 49 30	2254	95 4 49	2243	93 19 52	2233	91 34 40	2223
23	Regulus W.	101 51 59	2130	103 42 13	2124	105 32 35	2120	107 23 4	2115
	Spica W.	47 54 15	2159	49 43 45	2151	51 33 27	2143	53 23 20	2137
	Saturn E.	40 55 33	2124	39 5 11	2120	37 14 43	2117	35 24 10	2115
	α Aquilæ E.	55 48 23	2389	54 25 54	2444	53 4 27	2506	51 44 9	2576

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
15	Pollux W.	37 26 54	2981	38 57 30	2989	40 28 21	2958	41 59 26	2946
	Jupiter W.	34 8 9	3037	35 37 36	3036	37 7 17	3014	38 37 13	3001
	Spica E.	53 25 3	3001	51 54 51	2993	50 24 29	2984	48 53 56	2974
	Antares E.	99 15 29	2979	97 44 50	2969	96 13 58	2957	94 42 51	2946
16	Sun W.	104 56 50	3218	106 22 38	3204	107 48 43	3188	109 15 6	3173
	Pollux W.	49 38 53	2980	51 11 37	2986	52 44 40	2952	54 18 1	2936
	Jupiter W.	46 10 53	2935	47 42 28	2920	49 14 21	2906	50 46 32	2891
	Spica E.	41 18 11	2927	39 46 26	2917	38 14 29	2907	36 42 19	2898
	Antares E.	87 3 35	2883	85 30 55	2870	83 57 58	2856	82 24 43	2842
17	Sun W.	116 31 49	3091	118 0 10	3075	119 28 53	3056	120 57 57	3038
	Pollux W.	62 9 41	2759	63 45 3	2743	65 20 46	2726	66 56 51	2710
	Jupiter W.	58 32 19	2813	60 6 30	2797	61 41 2	2780	63 15 56	2764
	Regulus W.	26 17 49	2819	27 51 52	2796	29 26 25	2775	31 1 26	2753
	Spica E.	28 58 51	2862	27 25 44	2859	25 52 33	2859	24 19 22	2861
	Antares E.	74 33 46	2767	72 58 35	2752	71 23 4	2736	69 47 12	2719
18	Sun W.	128 28 52	2946	130 0 12	2927	131 31 56	2909	133 4 3	2890
	Pollux W.	75 2 53	2924	76 41 15	2907	78 20 1	2889	79 59 11	2873
	Jupiter W.	71 16 1	2877	72 53 12	2860	74 30 46	2842	76 8 44	2824
	Regulus W.	39 3 31	2851	40 41 17	2832	42 19 29	2813	43 58 7	2793
	Antares E.	61 42 25	2838	60 4 21	2821	58 25 55	2804	56 47 6	2788
	Saturn E.	103 59 57	2815	102 21 23	2798	100 42 25	2780	99 3 3	2763
	$\alpha$ Aquilæ E.	107 24 53	2471	106 3 57	2439	104 42 25	2409	103 20 19	2380
19	Pollux W.	88 21 1	2485	90 2 36	2467	91 44 35	2450	93 26 59	2433
	Jupiter W.	84 24 36	2537	86 4 58	2520	87 45 44	2502	89 26 54	2485
	Regulus W.	52 17 51	2499	53 59 5	2482	55 40 44	2463	57 22 49	2445
	Antares E.	48 27 24	2507	46 46 21	2492	45 4 56	2476	43 23 9	2462
	Saturn E.	90 40 10	2475	88 58 22	2458	87 16 10	2441	85 33 34	2424
	$\alpha$ Aquilæ E.	96 22 5	2356	94 57 2	2335	93 31 34	2314	92 5 42	2296
20	Pollux W.	102 4 50	2352	103 49 34	2337	105 34 40	2321	107 20 9	2307
	Jupiter W.	97 58 44	2403	99 42 15	2387	101 26 9	2371	103 10 26	2355
	Regulus W.	65 59 24	2361	67 43 55	2345	69 28 49	2330	71 14 5	2314
	Antares E.	34 49 20	2397	33 5 41	2386	31 21 46	2377	29 37 38	2370
	Saturn E.	76 54 36	2343	75 9 39	2327	73 24 19	2313	71 38 38	2298
	$\alpha$ Aquilæ E.	84 51 23	2124	83 23 42	2114	81 55 49	2105	80 27 46	2099
21	Regulus W.	80 5 52	2244	81 53 14	2231	83 40 55	2220	85 28 53	2208
	Spica W.	26 25 59	2250	28 10 46	2234	29 56 11	2201	31 42 9	2201
	Saturn E.	62 44 58	2220	60 57 15	2218	59 9 14	2206	57 20 56	2195
	$\alpha$ Aquilæ E.	73 6 15	2085	71 37 59	2101	70 9 51	2110	68 41 53	2120
22	Regulus W.	94 32 49	2159	96 22 19	2151	98 12 1	2143	100 1 55	2136
	Spica W.	40 38 47	2200	42 27 14	2189	44 15 58	2178	46 4 59	2168
	Saturn E.	48 15 31	2149	46 25 47	2149	44 35 52	2136	42 45 47	2130
	$\alpha$ Aquilæ E.	61 26 41	2226	60 1 3	2259	58 36 3	2227	57 11 48	2240
	Fomalhaut E.	89 49 14	2214	88 3 35	2207	86 17 45	2200	84 31 45	2224
23	Regulus W.	109 13 40	2112	111 4 21	2109	112 55 7	2107	114 45 56	2105
	Spica W.	55 13 22	2139	57 3 33	2137	58 53 51	2122	60 44 16	2120
	Saturn E.	33 33 33	2113	31 42 54	2113	29 52 15	2115	28 1 38	2116
	$\alpha$ Aquilæ E.	50 25 9	2055	49 7 34	2044	47 51 33	2044	46 37 16	2055



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
23	Fomalhaut E.	82° 45' 36"	2966	80° 59' 19"	2965	79° 12' 57"	2961	77° 26' 30"	2960
	α Pegasi E.	101 1 14	2643	99 21 1	2534	97 40 35	2525	95 59 56	2517
24	Spica W.	62 34 45	2117	64 25 18	2115	66 15 54	2114	68 6 32	2115
	Antares W.	17 0 26	2965	18 47 17	2923	20 34 55	2910	22 23 8	2192
	α Aquilæ E.	45 24 52	4061	44 14 32	4223	43 6 28	4394	42 0 52	4564
	Fomalhaut E.	68 34 5	2986	66 47 45	2991	65 1 32	2997	63 15 28	2904
	α Pegasi E.	87 34 45	2502	85 53 34	2502	84 12 24	2505	82 31 18	2510
25	Spica W.	77 19 26	2122	79 9 52	2126	81 0 12	2130	82 50 26	2134
	Antares W.	31 29 1	2153	33 18 39	2152	35 8 19	2151	36 58 0	2153
	Fomalhaut E.	54 28 32	2364	52 44 6	2381	51 0 4	2401	49 16 30	2423
	α Pegasi E.	74 7 53	2552	72 27 52	2565	70 48 9	2580	69 8 46	2596
	α Arietis E.	116 25 29	2927	114 37 56	2937	112 50 24	2938	111 2 53	2929
26	Spica W.	91 59 35	2165	93 48 55	2172	95 38 4	2181	97 27 0	2189
	Antares W.	46 5 32	2171	47 54 43	2176	49 43 46	2183	51 32 39	2190
	Fomalhaut E.	40 47 45	2577	39 8 19	2621	37 29 52	2670	35 52 32	2725
	α Pegasi E.	60 58 25	2710	59 21 58	2740	57 46 11	2772	56 11 6	2806
	α Arietis E.	102 6 16	2959	100 19 16	2966	98 32 26	2972	96 45 46	2980
	SUN E.	131 11 57	2434	129 29 11	2441	127 46 35	2450	126 4 11	2459
27	Spica W.	106 28 18	2228	108 15 49	2249	110 3 4	2260	111 50 2	2271
	Antares W.	60 34 14	2231	62 21 55	2241	64 9 22	2251	65 56 33	2262
	Saturn W.	18 38 43	2973	20 25 22	2972	22 12 3	2973	23 58 42	2977
	α Pegasi E.	48 28 37	3039	46 59 12	3100	45 31 2	3166	44 4 12	3239
	α Arietis E.	87 55 26	2385	86 10 3	2336	84 24 56	2347	82 40 5	2359
	SUN E.	117 35 30	2509	115 54 29	2519	114 13 42	2530	112 33 11	2541
28	Antares W.	74 48 40	2315	76 34 18	2326	78 19 39	2337	80 4 44	2349
	α Aquilæ W.	40 51 6	4203	41 50 40	4239	42 52 31	4285	43 56 27	4367
	Saturn W.	32 50 3	2311	34 35 46	2320	36 21 16	2330	38 6 32	2340
	α Arietis E.	74 0 13	2423	72 17 11	2436	70 34 28	2451	68 52 6	2466
	SUN E.	104 14 35	2601	102 35 42	2613	100 57 5	2626	99 18 46	2638
29	Antares W.	88 45 55	2406	90 29 19	2420	92 12 25	2432	93 55 14	2444
	α Aquilæ W.	49 41 29	3918	50 54 31	3955	52 8 37	3799	53 23 40	3749
	Saturn W.	46 49 7	2394	48 32 51	2404	50 16 20	2415	51 59 33	2426
	α Arietis E.	60 25 42	2547	58 45 34	2565	57 5 51	2583	55 26 33	2602
	SUN E.	91 11 24	2702	89 34 47	2715	87 58 27	2728	86 22 24	2741
30	Antares W.	102 25 6	2504	104 6 14	2515	105 47 6	2527	107 27 41	2539
	Saturn W.	60 31 39	2482	62 13 17	2484	63 54 39	2504	65 35 46	2516
	α Aquilæ W.	59 50 9	3576	61 9 10	3552	62 28 37	3531	63 48 27	3514
	Fomalhaut W.	24 13 35	3687	25 30 36	3562	26 49 52	3456	28 11 5	3368
	α Arietis E.	47 16 50	2710	45 40 23	2734	44 4 28	2761	42 29 9	2788
31	SUN E.	78 26 22	2804	76 51 59	2816	75 17 52	2828	73 44 1	2841
	Saturn W.	73 57 30	2570	75 37 6	2580	77 16 28	2591	78 55 35	2602
	α Aquilæ W.	70 31 42	3457	71 52 54	3451	73 14 13	3446	74 35 37	3445
	Fomalhaut W.	35 17 26	3109	36 45 25	3080	38 13 59	3056	39 43 2	3036
	α Pegasi W.	27 20 9	6121	28 4 7	5727	28 52 16	5402	29 44 9	5129
	α Arietis E.	34 42 38	2967	33 11 44	3014	31 41 49	3067	30 12 59	3126
	SUN E.	65 58 43	2901	64 26 25	2912	62 54 22	2924	61 22 33	2935

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Dist.	XVh.	P. L. of Dist.	XVIIIh.	P. L. of Dist.	XXIh.	P. L. of Dist.
23	Fomalhaut E. α Pegasi E.	75 40 1 94 19 6	2279 2511	73 53 30 92 38 8	2279 2507	72 6 59 90 57 4	2280 2504	70 20 30 89 15 56	2283 2509
24	Spica W. Antares W. α Aquilæ E. Fomalhaut E. α Pegasi E.	69 57 9 24 11 47 40 57 56 61 29 34 80 50 18	2115 2178 4769 2313 2515	71 47 46 26 0 47 39 57 54 59 43 53 79 9 25	2115 2109 5002 2294 2522	73 38 22 27 50 2 39 1 0 57 58 28 77 28 42	2116 2161 5268 2235 2530	75 28 56 29 39 28 38 7 29 56 13 20 75 48 10	2119 2157 5275 2249 2540
25	Spica W. Antares W. Fomalhaut E. α Pegasi E. α Arietis E.	84 40 33 38 47 39 47 33 28 67 29 46 109 15 24	2139 2155 2447 2615 2942	86 30 32 40 37 15 45 51 0 65 51 11 107 27 59	2145 2157 2475 2635 2945	88 20 23 42 26 47 44 9 11 64 13 4 105 40 38	2151 2161 2504 2658 2949	90 10 4 44 16 13 42 28 4 62 35 28 103 53 24	2158 2166 2539 2663 2953
26	Spica W. Antares W. Fomalhaut E. α Pegasi E. α Arietis E. Sun E.	99 15 44 53 21 22 34 16 26 54 36 48 94 59 17 124 22 0	2198 2197 2799 2846 2988 2468	101 4 14 55 9 54 32 41 44 53 3 20 93 13 0 122 40 2	2208 2206 2863 2886 2296 2477	102 52 30 56 58 13 31 8 38 51 30 46 91 26 55 120 58 17	2217 2214 2948 2934 2306 2487	104 40 32 58 46 20 29 37 20 49 59 10 89 41 4 119 16 46	2226 2223 3046 2984 2315 2496
27	Spica W. Antares W. Saturn W. α Pegasi E. α Arietis E. Sun E.	113 36 44 67 43 29 25 45 15 42 38 49 80 55 31 110 52 55	2263 2272 2282 3320 2371 2553	115 23 9 69 30 10 27 31 41 41 15 1 79 11 14 109 12 55	2265 2289 2287 3412 2383 2565	117 9 16 71 16 36 29 17 59 39 52 58 77 27 15 107 33 12	2307 2293 2294 3514 2396 2577	118 55 6 73 2 46 31 4 7 38 32 49 75 43 35 105 53 45	2318 2304 2309 3696 2409 2589
28	Antares W. α Aquilæ W. Saturn W. α Arietis E. Sun E.	81 49 32 45 2 18 39 51 33 67 10 5 97 40 43	2361 4254 2350 2481 2651	83 34 3 46 9 53 41 36 20 65 28 25 96 2 57	2373 4155 2361 2497 2664	85 18 17 47 19 2 43 20 51 63 47 8 94 25 29	2384 4066 2371 2513 2677	87 2 14 48 29 37 45 5 7 62 6 13 92 48 18	2398 3987 2399 2536 2689
29	Antares W. α Aquilæ W. Saturn W. α Arietis E. Sun E.	95 37 46 54 39 35 53 42 30 53 47 41 84 46 38	2456 3706 2438 2622 2753	97 20 1 55 56 16 55 25 11 52 9 16 83 11 9	2468 3667 2449 2642 2768	99 1 59 57 13 38 57 7 36 50 31 18 81 35 57	2480 3633 2460 2663 2779	100 43 41 58 31 37 58 49 45 48 53 49 80 1 1	2492 3698 2471 2686 2792
30	Antares W. Saturn W. α Aquilæ W. Fomalhaut W. α Arietis E. Sun E.	109 8 0 67 16 37 65 8 36 29 33 58 40 54 26 72 10 26	2551 2527 3497 3295 2619 2853	110 48 2 68 57 13 66 29 3 30 58 15 39 20 23 70 37 7	2562 2538 3485 3236 2652 2866	112 27 49 70 37 34 67 49 44 32 23 42 37 47 2 69 4 4	2574 2548 3473 3185 2687 2877	114 7 20 72 17 40 69 10 38 33 50 9 36 14 26 67 31 16	2585 2560 3464 3143 2994 2989
31	Saturn W. α Aquilæ W. Fomalhaut W. α Pegasi W. α Arietis E. Sun E.	80 34 27 75 57 3 41 12 30 30 39 24 28 45 21 59 50 59	2612 3443 3020 4896 3193 2946	82 13 5 77 18 31 42 42 18 31 37 42 27 19 4 58 19 39	2622 3442 3005 4897 3273 2958	83 51 30 78 40 0 44 12 24 32 38 44 25 54 20 56 48 34	2632 3443 2994 4525 3263 2989	85 29 41 80 1 28 45 42 44 33 42 14 24 31 21 55 17 42	2642 3446 2985 4376 3489 2990

## AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S						Sidereal Time of the Semi-diameter passing the Meridian.	Equation of Time, to be subtracted from		Diff. for 1 hour.
		Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Semi-diameter.	added to Apparent Time.				
Sat.	1	<sup>h</sup> 4 <sup>m</sup> 38 <sup>s</sup> 40.42	10.240	N.22° 8' 24".2	19.87	15' 48".21	68.44	<sup>m</sup> 2 <sup>s</sup> 25.26	" 0.383		
Sun.	2	4 42 46.41	10.257	22 16 9.6	18.90	15 48.08	68.50	2 15.86	0.400		
Mon.	3	4 46 52.78	10.273	22 23 31.8	17.93	15 47.95	68.55	2 6.08	0.416		
Tues.	4	4 50 59.53	10.288	22 30 30.5	16.95	15 47.82	68.60	1 55.93	0.431		
Wed.	5	4 55 6.63	10.302	22 37 5.5	15.96	15 47.69	68.64	1 45.41	0.445		
Thur.	6	4 59 14.05	10.314	22 43 16.8	14.97	15 47.58	68.69	1 34.55	0.457		
Frid.	7	5 3 21.77	10.327	22 49 4.2	13.97	15 47.47	68.73	1 23.41	0.470		
Sat.	8	5 7 29.77	10.338	22 54 27.6	12.96	15 47.37	68.77	1 12.00	0.481		
Sun.	9	5 11 38.02	10.348	22 59 26.8	11.95	15 47.27	68.80	1 0.34	0.491		
Mon.	10	5 15 46.50	10.357	23 4 1.7	10.94	15 47.18	68.83	0 48.43	0.500		
Tues.	11	5 19 55.20	10.365	23 8 12.3	9.92	15 47.09	68.86	0 36.32	0.508		
Wed.	12	5 24 4.07	10.373	23 11 58.2	8.91	15 47.01	68.89	0 24.05	0.516		
Thur.	13	5 28 13.09	10.379	23 15 19.7	7.88	15 46.93	68.91	0 11.62	0.522		
Frid.	14	5 32 22.25	10.383	23 18 16.5	6.85	15 46.85	68.93	0 0.94	0.526		
Sat.	15	5 36 31.52	10.387	23 20 48.6	5.82	15 46.78	68.95	0 13.61	0.530		
Sun.	16	5 40 40.88	10.391	23 22 56.0	4.79	15 46.71	68.96	0 26.37	0.534		
Mon.	17	5 44 50.30	10.394	23 24 38.7	3.76	15 46.64	68.97	0 39.21	0.537		
Tues.	18	5 48 59.79	10.395	23 25 56.6	2.73	15 46.58	68.97	0 52.10	0.538		
Wed.	19	5 53 9.29	10.395	23 26 49.7	1.70	15 46.53	68.97	1 5.00	0.538		
Thur.	20	5 57 18.80	10.395	23 27 18.0	+0.67	15 46.48	68.97	1 17.91	0.538		
Frid.	21	6 1 28.29	10.395	23 27 21.6	-0.37	15 46.43	68.97	1 30.80	0.538		
Sat.	22	6 5 37.74	10.393	23 27 0.3	1.40	15 46.38	68.97	1 43.68	0.536		
Sun.	23	6 9 47.15	10.390	23 26 14.2	2.43	15 46.34	68.96	1 56.48	0.533		
Mon.	24	6 13 56.49	10.387	23 25 3.5	3.46	15 46.30	68.95	2 9.22	0.530		
Tues.	25	6 18 5.74	10.382	23 23 28.0	4.49	15 46.26	68.93	2 21.86	0.525		
Wed.	26	6 22 14.87	10.377	23 21 27.9	5.53	15 46.23	68.91	2 34.40	0.520		
Thur.	27	6 26 23.86	10.371	23 19 3.2	6.55	15 46.20	68.89	2 46.81	0.514		
Frid.	28	6 30 32.70	10.364	23 16 14.0	7.57	15 46.16	68.88	2 59.06	0.507		
Sat.	29	6 34 41.36	10.356	23 13 0.3	8.58	15 46.14	68.85	3 11.13	0.499		
Sun.	30	6 38 49.82	10.347	23 9 22.3	9.60	15 46.13	68.81	3 23.00	0.490		
Mon.	31	6 42 58.05	10.337	N.23 5 19.9	10.61	15 46.12	68.77	3 34.64	0.480		

NOTE.—Mean Time of the Semidiameter passing may be found by subtracting 0s.19 from the Sidereal Time.

## AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time, to be added to		Diff. for 1 hour.	Sidereal Time or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	subtracted from Mean Time.			
Sat.	1	<sup>h</sup> 4 <sup>m</sup> 38 <sup>s</sup> 40.83	<sup>s</sup> 10.239	N.22° 8' 25.0"	" 19.87	<sup>m</sup> 2 <sup>s</sup> 25.24	<sup>s</sup> +0.383	<sup>h</sup> 4 <sup>m</sup> 41 <sup>s</sup> 6.07	
Sun.	2	4 42 46.79	10.256	22 16 10.3	18.90	2 15.84	0.400	4 45 2.63	
Mon.	3	4 46 53.14	10.272	22 23 32.4	17.93	2 6.05	0.416	4 48 59.19	
Tues.	4	4 50 59.86	10.287	22 30 31.0	16.95	1 55.89	0.431	4 52 55.75	
Wed.	5	4 55 6.93	10.301	22 37 6.0	15.96	1 45.37	0.445	4 56 52.30	
Thur.	6	4 59 14.32	10.313	22 43 17.2	14.97	1 34.54	0.457	5 0 48.86	
Frid.	7	5 3 22.01	10.326	22 49 4.5	13.97	1 23.41	0.470	5 4 45.42	
Sat.	8	5 7 29.98	10.337	22 54 27.8	12.96	1 12.00	0.481	5 8 41.98	
Sun.	9	5 11 38.20	10.347	22 59 27.0	11.95	1 0.34	0.491	5 12 38.54	
Mon.	10	5 15 46.65	10.356	23 4 1.9	10.94	0 48.44	0.500	5 16 35.09	
Tues.	11	5 19 55.31	10.364	23 8 12.4	9.92	0 36.34	0.508	5 20 31.65	
Wed.	12	5 24 4.14	10.372	23 11 58.3	8.91	0 24.07	0.516	5 24 28.21	
Thur.	13	5 28 13.13	10.378	23 15 19.7	7.88	0 11.64	0.522	5 28 24.77	
Frid.	14	5 32 22.25	10.382	23 18 16.5	6.85	0 0.92	0.526	5 32 21.33	
Sat.	15	5 36 31.48	10.386	23 20 48.6	5.82	0 13.60	0.530	5 36 17.88	
Sun.	16	5 40 40.80	10.390	23 22 56.0	4.79	0 26.36	0.534	5 40 14.44	
Mon.	17	5 44 50.19	10.393	23 24 38.6	3.76	0 39.19	0.537	5 44 11.00	
Tues.	18	5 48 59.64	10.394	23 25 56.5	2.73	0 52.08	0.538	5 48 7.56	
Wed.	19	5 53 9.10	10.394	23 26 49.6	1.70	1 4.98	0.538	5 52 4.12	
Thur.	20	5 57 18.57	10.394	23 27 18.0	+0.67	1 17.89	0.538	5 56 0.68	
Frid.	21	6 1 28.02	10.394	23 27 21.6	-0.37	1 30.78	0.538	5 59 57.24	
Sat.	22	6 5 37.44	10.392	23 27 0.3	1.40	1 43.63	0.536	6 3 53.81	
Sun.	23	6 9 46.81	10.389	23 26 14.3	2.43	1 56.46	0.533	6 7 50.35	
Mon.	24	6 13 56.11	10.386	23 25 3.6	3.46	2 9.20	0.530	6 11 46.91	
Tues.	25	6 18 5.32	10.381	23 23 28.2	4.49	2 21.85	0.525	6 15 43.47	
Wed.	26	6 22 14.42	10.376	23 21 28.1	5.53	2 34.39	0.520	6 19 40.03	
Thur.	27	6 26 23.37	10.370	23 19 3.5	6.55	2 46.79	0.514	6 23 36.58	
Frid.	28	6 30 32.17	10.363	23 16 14.4	7.57	2 59.03	0.507	6 27 33.14	
Sat.	29	6 34 40.80	10.355	23 13 0.8	8.58	3 11.11	0.499	6 31 29.70	
Sun.	30	6 38 49.23	10.346	23 9 22.8	9.60	3 22.97	0.490	6 35 26.26	
Mon.	31	6 42 57.43	10.336	N.23° 5' 20.5"	10.61	3 34.61	+0.480	6 39 22.82	

NOTE.—The Semidiameter for Mean Noon may be assumed the same as that for Apparent Noon.

Diff. for 1 hour  
+9".8565

AT GREENWICH MEAN NOON.									
Day of the Month.	Day of the Year.	THE SUN'S				Logarithm of the Radius Vector of the Earth.	Diff. for 1 hour.	Mean Time of Sidereal Ch.	
		True LONGITUDE. .		Diff. for 1 hour.	LATITUDE.				
		$\lambda$	$\lambda'$						
1	153	71° 13' 59.9	13' 56.2	143.65	−0.61	0.0062727	+26.3	19 <sup>h</sup> 15 <sup>m</sup> 44.06	
2	154	72 11 27.2	11 23.4	143.62	0.53	.0063348	25.4	19 11 48.15	
3	155	73 8 53.7	8 49.7	143.59	0.43	.0063946	24.4	19 7 52.24	
4	156	74 6 19.5	6 15.3	143.56	0.31	.0064521	23.4	19 3 56.33	
5	157	75 3 44.5	3 40.1	143.52	0.18	.0065072	22.4	19 0 0.42	
6	158	76 1 8.6	1 4.0	143.49	−0.04	.0065598	21.4	18 56 4.51	
7	159	76 58 32.0	58 27.2	143.46	+0.09	.0066100	20.4	18 52 8.60	
8	160	77 55 54.6	55 49.6	143.43	0.20	.0066577	19.4	18 48 12.67	
9	161	78 53 16.3	53 11.1	143.39	0.30	.0067029	18.4	18 44 16.76	
10	162	79 50 37.1	50 31.8	143.35	0.38	.0067457	17.4	18 40 20.85	
11	163	80 47 56.9	47 51.4	143.31	0.43	.0067862	16.5	18 36 24.94	
12	164	81 45 15.8	45 10.2	143.27	0.45	.0068244	15.6	18 32 29.03	
13	165	82 42 33.9	42 28.1	143.23	0.44	.0068606	14.7	18 28 33.12	
14	166	83 39 51.1	39 45.1	143.19	0.41	.0068948	13.9	18 24 37.21	
15	167	84 37 7.4	37 1.2	143.16	0.34	.0069272	13.1	18 20 41.30	
16	168	85 34 22.9	34 16.5	143.13	0.25	.0069579	12.4	18 16 45.38	
17	169	86 31 37.7	31 31.1	143.10	0.15	.0069869	11.7	18 12 49.46	
18	170	87 28 51.8	28 45.0	143.08	+0.02	.0070143	11.1	18 8 53.55	
19	171	88 26 5.4	25 58.4	143.06	−0.11	.0070402	10.5	18 4 57.64	
20	172	89 23 18.5	23 11.4	143.04	0.25	.0070646	9.9	18 1 1.72	
21	173	90 20 31.1	20 23.8	143.02	0.38	.0070877	9.3	17 57 5.81	
22	174	91 17 43.4	17 35.9	143.01	0.50	.0071094	8.7	17 53 9.90	
23	175	92 14 55.5	14 47.8	143.00	0.60	.0071296	8.2	17 49 13.99	
24	176	93 12 7.4	11 59.5	142.99	0.66	.0071483	7.6	17 45 18.08	
25	177	94 9 19.2	9 11.1	142.99	0.70	.0071655	6.9	17 41 22.17	
26	178	95 6 31.0	6 22.7	142.99	0.71	.0071810	6.1	17 37 26.26	
27	179	96 3 42.8	3 34.3	143.00	0.68	.0071946	5.3	17 33 30.35	
28	180	97 0 54.8	0 46.1	143.00	0.63	.0072063	4.5	17 29 34.43	
29	181	97 58 7.0	57 58.1	143.01	0.55	.0072160	3.6	17 25 38.52	
30	182	98 55 19.4	55 10.3	143.01	0.46	.0072235	2.7	17 21 42.61	
31	183	99 52 31.9	52 22.6	143.02	−0.34	0.0072287	+ 1.7	17 17 46.70	
NOTE: $\lambda$ corresponds to the true equinox of the date, $\lambda'$ to the mean equinox of January 0d.								Diff. for 1 hour −9 <sup>s</sup> .8296	

## GREENWICH MEAN TIME.

## THE MOON'S

Day of the Month.	SEMI-DIAMETER.		HORIZONTAL PARALLAX.				MERIDIAN PASSAGE.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 hour.	Midnight.	Diff. for 1 hour.		Diff. for 1 hour.	
							<sup>h</sup> <sup>m</sup>	<sup>m</sup>	
1	15' 29.9	15' 25.3	56' 46.3	-1.44	56' 29.4	-1.38	21 8.3	1.86	24.9
2	15 20.9	15 16.7	56 13.2	1.32	55 57.8	1.26	21 53.1	1.89	25.9
3	15 12.7	15 8.9	55 43.0	1.19	55 29.1	1.13	22 39.2	1.95	26.9
4	15 5.4	15 2.0	55 16.0	1.06	55 3.7	0.98	23 26.8	2.02	27.9
5	14 58.9	14 56.1	54 52.4	0.91	54 41.9	0.83	6		28.9
6	14 53.5	14 51.2	54 32.4	0.75	54 24.0	0.66	0 16.0	2.07	0.4
7	14 49.2	14 47.6	54 16.7	0.56	54 10.7	0.44	1 6.3	2.10	1.4
8	14 46.3	14 45.5	54 6.1	0.32	54 3.0	-0.19	1 56.8	2.09	2.4
9	14 45.1	14 45.2	54 1.6	-0.04	54 2.0	+0.12	2 46.6	2.04	3.4
10	14 45.8	14 47.1	54 4.3	+0.28	54 8.8	0.46	3 34.8	1.97	4.4
11	14 48.9	14 51.3	54 15.4	0.65	54 24.3	0.84	4 21.2	1.89	5.4
12	14 54.3	14 58.0	54 35.6	1.03	54 49.2	1.23	5 5.9	1.83	6.4
13	15 2.4	15 7.4	55 5.1	1.43	55 23.4	1.62	5 49.2	1.80	7.4
14	15 13.0	15 19.1	55 44.0	1.80	56 6.6	1.97	6 32.2	1.80	8.4
15	15 25.8	15 32.9	56 31.1	2.11	56 57.2	2.24	7 15.8	1.85	9.4
16	15 40.4	15 48.1	57 24.7	2.33	57 53.0	2.38	8 1.1	1.96	10.4
17	15 55.9	16 3.6	58 21.6	2.38	58 50.0	2.34	8 49.5	2.11	11.4
18	16 11.1	16 18.2	59 17.5	2.23	59 43.4	2.07	9 42.2	2.30	12.4
19	16 24.6	16 30.2	60 7.1	1.85	60 27.8	1.58	10 40.0	2.52	13.4
20	16 34.9	16 38.5	60 44.9	1.26	60 58.0	0.91	11 42.7	2.63	14.4
21	16 40.8	16 41.9	61 6.6	+0.53	61 10.6	+0.14	12 48.4	2.75	15.4
22	16 41.7	16 40.2	61 9.9	-0.36	61 4.5	-0.63	13 54.0	2.67	16.4
23	16 37.6	16 33.9	60 54.8	0.98	60 41.1	1.29	14 56.5	2.50	17.4
24	16 29.2	16 23.7	60 23.9	1.56	60 3.9	1.77	15 54.3	2.30	18.4
25	16 17.7	16 11.2	59 41.7	1.92	59 17.9	2.03	16 47.2	2.12	19.4
26	16 4.5	15 57.6	58 53.1	2.09	58 27.9	2.11	17 36.2	1.97	20.4
27	15 50.7	15 44.0	58 2.7	2.08	57 38.0	2.03	18 22.5	1.89	21.4
28	15 37.5	15 31.3	57 14.1	1.95	56 51.2	1.86	19 7.3	1.86	22.4
29	15 25.4	15 19.9	56 29.6	1.75	56 9.3	1.63	19 52.0	1.86	23.4
30	15 14.7	15 10.0	55 50.5	1.51	55 33.1	1.38	20 37.3	1.92	24.4
31	15 5.7	15 1.8	55 17.4	-1.25	55 3.1	-1.13	21 24.0	1.98	25.0

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SATURDAY 1.					MONDAY 3.				
0	1 11 24.15	1.9636	N. 2° 53' 16.6"	13.944	0	2 46 0.75	1.9997	N. 13° 18' 40.6"	11.779
1	1 13 21.95	1.9630	3 7 12.6	13.990	1	2 48 0.79	2.0017	13 30 25.0	11.706
2	1 15 19.72	1.9625	3 21 7.0	13.895	2	2 50 0.96	2.0038	13 42 5.4	11.639
3	1 17 17.46	1.9620	3 34 59.9	13.869	3	2 52 1.26	2.0059	13 53 41.7	11.571
4	1 19 15.16	1.9615	3 48 51.2	13.842	4	2 54 1.68	2.0080	14 5 13.9	11.502
5	1 21 12.84	1.9610	4 2 40.9	13.815	5	2 56 2.21	2.0100	14 16 41.9	11.431
6	1 23 10.49	1.9606	4 16 29.0	13.787	6	2 58 2.87	2.0121	14 28 5.6	11.360
7	1 25 8.12	1.9604	4 30 15.3	13.757	7	3 0 3.66	2.0143	14 39 25.1	11.289
8	1 27 5.74	1.9603	4 43 59.8	13.726	8	3 2 4.59	2.0166	14 50 40.3	11.217
9	1 29 3.36	1.9602	4 57 42.4	13.694	9	3 4 5.66	2.0189	15 1 51.1	11.144
10	1 31 0.97	1.9601	5 11 23.1	13.662	10	3 6 6.86	2.0211	15 12 57.5	11.070
11	1 32 58.57	1.9601	5 25 1.8	13.629	11	3 8 8.20	2.0234	15 23 59.4	10.995
12	1 34 56.18	1.9601	5 38 38.6	13.595	12	3 10 9.68	2.0258	15 34 56.8	10.919
13	1 36 53.79	1.9602	5 52 13.3	13.559	13	3 12 11.30	2.0281	15 45 49.6	10.842
14	1 38 51.41	1.9604	6 5 45.8	13.522	14	3 14 13.06	2.0305	15 56 37.8	10.764
15	1 40 49.05	1.9607	6 19 16.0	13.485	15	3 16 14.96	2.0329	16 7 21.3	10.686
16	1 42 46.71	1.9610	6 32 44.0	13.448	16	3 18 17.01	2.0354	16 18 0.1	10.607
17	1 44 44.38	1.9613	6 46 9.8	13.410	17	3 20 19.21	2.0378	16 28 34.1	10.527
18	1 46 42.07	1.9617	6 59 33.3	13.371	18	3 22 21.55	2.0402	16 39 3.3	10.446
19	1 48 39.79	1.9622	7 12 54.4	13.331	19	3 24 24.04	2.0427	16 49 27.6	10.364
20	1 50 37.54	1.9628	7 26 13.0	13.289	20	3 26 26.68	2.0453	16 59 47.0	10.282
21	1 52 35.33	1.9634	7 39 29.0	13.246	21	3 28 29.48	2.0479	17 10 1.5	10.200
22	1 54 33.16	1.9641	7 52 42.5	13.203	22	3 30 32.43	2.0504	17 20 11.0	10.116
23	1 56 31.03	1.9648	N. 8 5 53.4	13.159	23	3 32 35.52	2.0529	N. 17 30 15.4	10.031
SUNDAY 2.					TUESDAY 4.				
0	1 58 28.94	1.9656	N. 8 19 1.6	13.115	0	3 34 38.77	2.0554	N. 17 40 14.7	9.945
1	2 0 26.90	1.9665	8 32 7.1	13.069	1	3 36 42.18	2.0580	17 50 8.8	9.859
2	2 2 24.92	1.9673	8 45 9.8	13.022	2	3 38 45.74	2.0606	17 59 57.7	9.773
3	2 4 22.99	1.9683	8 58 9.7	12.974	3	3 40 49.46	2.0633	18 9 41.5	9.686
4	2 6 21.12	1.9693	9 11 6.7	12.925	4	3 42 53.34	2.0660	18 19 20.0	9.597
5	2 8 19.31	1.9704	9 24 0.7	12.876	5	3 44 57.37	2.0686	18 28 53.1	9.506
6	2 10 17.57	1.9716	9 36 51.8	12.827	6	3 47 1.56	2.0712	18 38 20.7	9.415
7	2 12 15.90	1.9727	9 49 39.9	12.776	7	3 49 5.91	2.0738	18 47 42.9	9.325
8	2 14 14.30	1.9739	10 2 24.8	12.723	8	3 51 10.42	2.0765	18 56 59.7	9.234
9	2 16 12.77	1.9752	10 15 6.6	12.670	9	3 53 15.09	2.0792	19 6 11.0	9.142
10	2 18 11.32	1.9765	10 27 45.2	12.616	10	3 55 19.92	2.0818	19 15 16.7	9.049
11	2 20 9.95	1.9779	10 40 20.5	12.562	11	3 57 24.90	2.0844	19 24 16.8	8.955
12	2 22 8.66	1.9793	10 52 52.6	12.507	12	3 59 30.05	2.0871	19 33 11.3	8.861
13	2 24 7.46	1.9807	11 5 21.3	12.450	13	4 1 35.36	2.0898	19 42 0.1	8.765
14	2 26 6.35	1.9822	11 17 46.6	12.392	14	4 3 40.82	2.0924	19 50 43.1	8.669
15	2 28 5.33	1.9837	11 30 8.4	12.334	15	4 5 46.44	2.0950	19 59 20.4	8.573
16	2 30 4.40	1.9853	11 42 26.7	12.275	16	4 7 52.22	2.0976	20 7 51.8	8.475
17	2 32 3.57	1.9870	11 54 41.4	12.216	17	4 9 58.16	2.1003	20 16 17.3	8.377
18	2 34 2.85	1.9888	12 6 52.6	12.156	18	4 12 4.25	2.1029	20 24 37.0	8.278
19	2 36 2.23	1.9905	12 19 0.1	12.094	19	4 14 10.50	2.1055	20 32 50.7	8.178
20	2 38 1.71	1.9923	12 31 3.8	12.031	20	4 16 16.91	2.1081	20 40 58.4	8.078
21	2 40 1.30	1.9941	12 43 3.8	11.968	21	4 18 23.48	2.1107	20 49 0.1	7.978
22	2 42 1.01	1.9960	12 55 0.0	11.904	22	4 20 30.20	2.1133	20 56 55.7	7.876
23	2 44 0.83	1.9978	13 6 52.3	11.838	23	4 22 37.07	2.1158	21 4 45.2	7.774
24	2 46 0.75	1.9997	N. 13 18 40.6	11.772	24	4 24 44.10	2.1184	N. 21 12 28.6	7.671

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
WEDNESDAY 5.					FRIDAY 7.				
0	4 24 44.10	2.1184	N.21° 19' 28.6"	7.671	0	6 8 45.70	2.1990	N.25° 11' 53.6"	2.147
1	4 26 51.28	2.1910	21 20 5.8	7.568	1	6 10 57.65	2.1996	25 13 58.7	2.094
2	4 28 58.61	2.1935	21 27 36.7	7.464	2	6 13 9.63	2.1998	25 15 56.4	1.990
3	4 31 6.09	2.1960	21 35 1.4	7.360	3	6 15 21.63	2.2001	25 17 46.7	1.776
4	4 33 13.72	2.1985	21 42 19.8	7.254	4	6 17 33.64	2.2003	25 19 29.6	1.653
5	4 35 21.50	2.1309	21 49 31.8	7.147	5	6 19 45.66	2.2006	25 21 5.1	1.531
6	4 37 29.42	2.1333	21 56 37.4	7.040	6	6 21 57.70	2.2007	25 22 33.3	1.408
7	4 39 37.49	2.1357	22 3 36.6	6.933	7	6 24 9.74	2.2007	25 23 54.1	1.284
8	4 41 45.70	2.1381	22 10 29.4	6.826	8	6 26 21.77	2.2006	25 25 7.4	1.160
9	4 43 54.06	2.1405	22 17 15.7	6.718	9	6 28 33.80	2.2005	25 26 13.3	1.036
10	4 46 2.56	2.1428	22 23 55.5	6.608	10	6 30 45.82	2.2004	25 27 11.8	0.913
11	4 48 11.19	2.1450	22 30 28.7	6.498	11	6 32 57.84	2.2002	25 28 3.0	0.791
12	4 50 19.95	2.1473	22 36 55.3	6.388	12	6 35 9.84	2.1999	25 28 46.8	0.668
13	4 52 28.85	2.1494	22 43 15.3	6.278	13	6 37 21.82	2.1995	25 29 23.2	0.544
14	4 54 37.88	2.1517	22 49 28.6	6.167	14	6 39 33.78	2.1991	25 29 52.2	0.420
15	4 56 47.05	2.1539	22 55 35.3	6.056	15	6 41 45.71	2.1986	25 30 13.7	0.297
16	4 58 56.35	2.1560	23 1 35.3	5.944	16	6 43 57.61	2.1980	25 30 27.8	0.174
17	5 1 5.77	2.1580	23 7 28.5	5.830	17	6 46 9.47	2.1974	25 30 34.6	+0.052
18	5 3 15.31	2.1600	23 13 14.9	5.716	18	6 48 21.30	2.1968	25 30 34.1	-0.070
19	5 5 24.97	2.1620	23 18 54.5	5.603	19	6 50 33.09	2.1961	25 30 26.2	0.193
20	5 7 34.75	2.1640	23 24 27.3	5.489	20	6 52 44.83	2.1952	25 30 10.9	0.315
21	5 9 44.66	2.1660	23 29 53.2	5.375	21	6 54 56.51	2.1944	25 29 48.3	0.438
22	5 11 54.68	2.1680	23 35 12.2	5.260	22	6 57 8.14	2.1935	25 29 18.3	0.561
23	5 14 4.81	2.1698	N.23 40 24.3	5.145	23	6 59 19.72	2.1926	N.25 28 41.0	0.683
THURSDAY 6.					SATURDAY 8.				
0	5 16 15.05	2.1716	N.23 45 29.5	5.029	0	7 1 31.25	2.1915	N.25 27 56.4	0.804
1	5 18 25.39	2.1733	23 50 27.7	4.919	1	7 3 42.71	2.1904	25 27 4.5	0.686
2	5 20 35.84	2.1750	23 55 18.9	4.795	2	7 5 54.10	2.1890	25 26 5.3	1.048
3	5 22 46.39	2.1766	24 0 3.1	4.678	3	7 8 5.41	2.1879	25 24 58.7	1.170
4	5 24 57.04	2.1783	24 4 40.2	4.560	4	7 10 16.65	2.1867	25 23 44.9	1.320
5	5 27 7.78	2.1799	24 9 10.2	4.442	5	7 12 27.81	2.1854	25 22 23.9	1.411
6	5 29 18.62	2.1815	24 13 33.2	4.324	6	7 14 38.89	2.1840	25 20 55.6	1.532
7	5 31 29.55	2.1829	24 17 49.1	4.205	7	7 16 49.89	2.1825	25 19 20.1	1.652
8	5 33 40.56	2.1843	24 21 57.8	4.085	8	7 19 0.80	2.1810	25 17 37.4	1.772
9	5 35 51.65	2.1856	24 25 59.3	3.965	9	7 21 11.61	2.1796	25 15 47.4	1.892
10	5 38 2.82	2.1868	24 29 53.7	3.846	10	7 23 22.33	2.1779	25 13 50.2	2.012
11	5 40 14.07	2.1881	24 33 40.9	3.727	11	7 25 32.95	2.1762	25 11 45.9	2.131
12	5 42 25.39	2.1893	24 37 21.0	3.606	12	7 27 43.47	2.1745	25 9 34.6	2.249
13	5 44 36.78	2.1905	24 40 53.8	3.487	13	7 29 53.89	2.1727	25 7 16.1	2.368
14	5 46 48.24	2.1915	24 44 19.3	3.366	14	7 32 4.20	2.1708	25 4 50.5	2.487
15	5 48 59.76	2.1926	24 47 37.6	3.244	15	7 34 14.39	2.1689	25 2 17.7	2.605
16	5 51 11.34	2.1936	24 50 48.6	3.122	16	7 36 24.47	2.1670	24 59 37.9	2.722
17	5 53 22.98	2.1944	24 53 52.3	3.001	17	7 38 34.43	2.1650	24 56 51.1	2.838
18	5 55 34.67	2.1953	24 56 48.8	2.880	18	7 40 44.27	2.1630	24 53 57.3	2.955
19	5 57 46.41	2.1960	24 59 38.0	2.758	19	7 42 53.99	2.1609	24 50 56.5	3.071
20	5 59 58.19	2.1967	25 2 19.8	2.636	20	7 45 3.58	2.1588	24 47 48.7	3.187
21	6 2 10.01	2.1974	25 4 54.2	2.513	21	7 47 13.04	2.1566	24 44 34.0	3.303
22	6 4 21.87	2.1980	25 7 21.3	2.391	22	7 49 22.37	2.1544	24 41 12.4	3.418
23	6 6 33.77	2.1985	25 9 41.1	2.269	23	7 51 31.57	2.1522	24 37 43.9	3.534
24	6 8 45.70	2.1990	N.25 11 53.6	2.147	24	7 53 40.63	2.1499	N.24 34 8.4	3.648



## GREENWICH MEAN TIME

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SUNDAY 9.					TUESDAY 11.				
0	7 <sup>h</sup> 53 <sup>m</sup> 40.63	2.1499	N.24° 34' 8.4"	3.648	0	9 <sup>h</sup> 33 <sup>m</sup> 42.26	2.0133	N.19° 37' 17.7"	8.500
1	7 55 49.55	2.1476	24 30 26.1	3.762	1	9 35 42.97	2.0104	19 28 45.1	8.586
2	7 57 58.33	2.1452	24 26 37.0	3.874	2	9 37 43.51	2.0075	19 20 7.3	8.672
3	8 0 6.97	2.1428	24 22 41.2	3.986	3	9 39 43.87	2.0046	19 11 24.4	8.758
4	8 2 15.46	2.1403	24 18 38.6	4.099	4	9 41 44.06	2.0018	19 2 36.4	8.842
5	8 4 23.80	2.1378	24 14 29.3	4.211	5	9 43 44.09	1.9991	18 53 43.4	8.926
6	8 6 31.99	2.1353	24 10 13.2	4.322	6	9 45 43.95	1.9963	18 44 45.4	9.009
7	8 8 40.03	2.1327	24 5 50.5	4.433	7	9 47 43.64	1.9935	18 35 42.4	9.091
8	8 10 47.91	2.1301	24 1 21.2	4.544	8	9 49 43.16	1.9907	18 26 34.5	9.173
9	8 12 55.64	2.1275	23 56 45.2	4.655	9	9 51 42.52	1.9879	18 17 21.6	9.255
10	8 15 3.21	2.1248	23 52 2.6	4.764	10	9 53 41.71	1.9852	18 8 3.9	9.335
11	8 17 10.62	2.1221	23 47 13.5	4.872	11	9 55 40.74	1.9826	17 58 41.4	9.415
12	8 19 17.86	2.1194	23 42 17.9	4.981	12	9 57 39.62	1.9800	17 49 14.1	9.494
13	8 21 24.94	2.1167	23 37 15.8	5.089	13	9 59 38.34	1.9774	17 39 42.1	9.573
14	8 23 31.86	2.1139	23 32 7.2	5.197	14	10 1 36.90	1.9747	17 30 5.4	9.652
15	8 25 38.61	2.1111	23 26 52.2	5.304	15	10 3 35.30	1.9721	17 20 23.9	9.730
16	8 27 45.19	2.1083	23 21 30.8	5.410	16	10 5 33.55	1.9696	17 10 37.8	9.806
17	8 29 51.60	2.1054	23 16 3.0	5.515	17	10 7 31.65	1.9672	17 0 47.2	9.881
18	8 31 57.84	2.1026	23 10 28.9	5.620	18	10 9 29.61	1.9648	16 50 52.1	9.956
19	8 34 3.91	2.0997	23 4 48.5	5.725	19	10 11 27.42	1.9623	16 40 52.4	10.032
20	8 36 9.80	2.0968	22 59 1.9	5.830	20	10 13 25.08	1.9599	16 30 48.3	10.106
21	8 38 15.52	2.0939	22 53 9.0	5.934	21	10 15 22.60	1.9575	16 20 39.7	10.180
22	8 40 21.07	2.0910	22 47 9.9	6.036	22	10 17 19.98	1.9552	16 10 26.7	10.253
23	8 42 26.44	2.0880	N.22° 41' 4.7"	6.137	23	10 19 17.22	1.9529	N.16° 0' 9.4"	10.324
MONDAY 10.					WEDNESDAY 12.				
0	8 44 31.63	2.0850	N.22° 34' 53.4"	6.238	0	10 21 14.32	1.9506	N.15° 49' 47.8"	10.396
1	8 46 36.64	2.0821	22 28 36.0	6.340	1	10 23 11.29	1.9484	15 39 21.9	10.467
2	8 48 41.48	2.0792	22 22 12.5	6.441	2	10 25 8.13	1.9463	15 28 51.7	10.537
3	8 50 46.14	2.0762	22 15 43.0	6.542	3	10 27 4.84	1.9442	15 18 17.3	10.606
4	8 52 50.62	2.0733	22 9 7.5	6.642	4	10 29 1.43	1.9422	15 7 38.7	10.677
5	8 54 54.92	2.0703	22 2 26.1	6.740	5	10 30 57.90	1.9401	14 56 56.0	10.745
6	8 56 59.03	2.0672	21 55 38.7	6.838	6	10 32 54.24	1.9380	14 46 9.3	10.813
7	8 59 2.96	2.0642	21 48 45.4	6.936	7	10 34 50.46	1.9361	14 35 18.5	10.880
8	9 1 6.72	2.0612	21 41 46.3	7.032	8	10 36 46.57	1.9343	14 24 23.7	10.948
9	9 3 10.30	2.0582	21 34 41.5	7.128	9	10 38 42.57	1.9324	14 13 24.8	11.015
10	9 5 13.70	2.0551	21 27 30.9	7.224	10	10 40 38.46	1.9306	14 2 22.0	11.079
11	9 7 16.91	2.0519	21 20 14.6	7.320	11	10 42 34.24	1.9288	13 51 15.3	11.143
12	9 9 19.93	2.0488	21 12 52.5	7.415	12	10 44 29.91	1.9270	13 40 4.8	11.207
13	9 11 22.77	2.0459	21 5 24.8	7.509	13	10 46 25.48	1.9254	13 28 50.1	11.271
14	9 13 25.44	2.0430	20 57 51.5	7.602	14	10 48 20.96	1.9239	13 17 32.4	11.334
15	9 15 27.93	2.0400	20 50 12.6	7.695	15	10 50 16.34	1.9223	13 6 10.4	11.397
16	9 17 30.24	2.0370	20 42 28.1	7.787	16	10 52 11.63	1.9207	12 54 44.7	11.458
17	9 19 32.37	2.0339	20 34 38.2	7.877	17	10 54 6.83	1.9192	12 43 15.4	11.518
18	9 21 34.31	2.0308	20 26 42.8	7.968	18	10 56 1.93	1.9177	12 31 42.6	11.578
19	9 23 36.07	2.0279	20 18 42.0	8.058	19	10 57 56.95	1.9164	12 20 6.1	11.638
20	9 25 37.66	2.0250	20 10 35.8	8.148	20	10 59 51.90	1.9152	12 8 26.0	11.698
21	9 27 39.08	2.0221	20 2 24.2	8.238	21	11 1 46.78	1.9140	11 56 42.4	11.756
22	9 29 40.32	2.0192	19 54 7.3	8.326	22	11 3 41.58	1.9128	11 44 55.3	11.814
23	9 31 41.38	2.0163	19 45 45.1	8.413	23	11 5 36.31	1.9115	11 33 4.8	11.870
24	9 33 42.26	2.0133	N.19° 37' 17.7"	8.500	24	11 7 30.96	1.9104	N.11° 21' 10.9"	11.926

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
THURSDAY 13.					SATURDAY 15.				
0	11 7 30.96	1.9104	N. 11° 21' 10.9"	11.986	0	12 39 9.36	1.9343	N. 0° 56' 19.8"	13.837
1	11 9 25.55	1.9094	11 9 13.6	11.983	1	12 41 5.49	1.9366	0 42 28.9	13.858
2	11 11 20.09	1.9085	10 57 13.0	12.038	2	12 43 1.76	1.9389	0 28 36.8	13.878
3	11 13 14.57	1.9076	10 45 9.1	12.083	3	12 44 58.16	1.9413	0 14 43.6	13.897
4	11 15 9.00	1.9067	10 33 1.9	12.146	4	12 46 54.71	1.9438	N. 0 0 49.2	13.916
5	11 17 3.38	1.9058	10 20 51.5	12.188	5	12 48 51.41	1.9464	S. 0 13 6.3	13.934
6	11 18 57.70	1.9051	10 8 38.0	12.251	6	12 50 48.28	1.9491	0 27 2.9	13.952
7	11 20 51.98	1.9045	9 56 21.3	12.304	7	12 52 45.31	1.9518	0 41 0.5	13.967
8	11 22 46.23	1.9039	9 44 1.5	12.355	8	12 54 42.51	1.9546	0 54 59.0	13.981
9	11 24 40.44	1.9033	9 31 38.7	12.405	9	12 56 39.87	1.9575	1 8 58.3	13.995
10	11 26 34.62	1.9028	9 19 12.9	12.455	10	12 58 37.41	1.9606	1 22 58.5	14.009
11	11 28 28.77	1.9024	9 6 44.1	12.505	11	13 0 35.14	1.9637	1 36 59.5	14.022
12	11 30 22.90	1.9020	8 54 12.2	12.555	12	13 2 33.06	1.9669	1 51 1.2	14.033
13	11 32 17.01	1.9017	8 41 37.5	12.603	13	13 4 31.17	1.9701	2 5 3.5	14.043
14	11 34 11.10	1.9014	8 29 0.0	12.650	14	13 6 29.47	1.9733	2 19 6.4	14.053
15	11 36 5.17	1.9011	8 16 19.6	12.697	15	13 8 27.97	1.9767	2 33 9.9	14.062
16	11 37 59.23	1.9010	8 3 36.4	12.742	16	13 10 26.68	1.9802	2 47 13.8	14.069
17	11 39 53.30	1.9011	7 50 50.5	12.786	17	13 12 25.60	1.9837	3 1 18.1	14.075
18	11 41 47.37	1.9012	7 38 2.0	12.830	18	13 14 24.74	1.9874	3 15 22.8	14.081
19	11 43 41.44	1.9012	7 25 10.8	12.875	19	13 16 24.10	1.9911	3 29 27.8	14.085
20	11 45 35.51	1.9013	7 12 17.0	12.919	20	13 18 23.68	1.9949	3 43 33.0	14.089
21	11 47 29.59	1.9015	6 59 20.5	12.962	21	13 20 23.50	1.9988	3 57 38.4	14.091
22	11 49 23.69	1.9018	6 46 21.5	13.003	22	13 22 23.55	2.0028	4 11 43.9	14.092
23	11 51 17.81	1.9022	N. 6° 33' 20.1"	13.044	23	13 24 23.84	2.0069	S. 4 25 49.4	14.092
FRIDAY 14.					SUNDAY 16.				
0	11 53 11.95	1.9025	N. 6° 20' 16.2"	13.085	0	13 26 24.38	2.0111	S. 4 39 54.9	14.091
1	11 55 6.12	1.9030	6 7 9.9	13.125	1	13 28 25.17	2.0153	4 54 0.3	14.089
2	11 57 0.32	1.9035	5 54 1.2	13.164	2	13 30 26.22	2.0196	5 8 5.5	14.086
3	11 58 54.55	1.9041	5 40 50.2	13.203	3	13 32 27.52	2.0239	5 22 10.6	14.082
4	12 0 48.62	1.9049	5 27 36.9	13.241	4	13 34 29.09	2.0284	5 36 15.4	14.076
5	12 2 43.14	1.9057	5 14 21.4	13.278	5	13 36 30.94	2.0330	5 50 19.7	14.068
6	12 4 37.51	1.9066	5 1 3.6	13.315	6	13 38 33.06	2.0376	6 4 23.5	14.059
7	12 6 31.93	1.9075	4 47 43.7	13.350	7	13 40 35.46	2.0424	6 18 26.8	14.050
8	12 8 26.41	1.9085	4 34 21.7	13.385	8	13 42 38.15	2.0472	6 32 29.6	14.040
9	12 10 20.94	1.9095	4 20 57.6	13.419	9	13 44 41.13	2.0521	6 46 31.8	14.029
10	12 12 15.54	1.9106	4 7 31.5	13.451	10	13 46 44.40	2.0571	7 0 33.2	14.016
11	12 14 10.21	1.9118	3 54 3.5	13.483	11	13 48 47.98	2.0621	7 14 33.7	14.002
12	12 16 4.96	1.9131	3 40 33.5	13.515	12	13 50 51.86	2.0672	7 28 33.4	13.987
13	12 17 59.79	1.9144	3 27 1.7	13.546	13	13 52 56.05	2.0725	7 42 32.1	13.970
14	12 19 54.70	1.9158	3 13 28.0	13.577	14	13 55 0.56	2.0778	7 56 29.8	13.952
15	12 21 49.69	1.9173	2 59 52.4	13.607	15	13 57 5.39	2.0832	8 10 26.4	13.933
16	12 23 44.78	1.9188	2 46 15.1	13.636	16	13 59 10.55	2.0886	8 24 21.8	13.912
17	12 25 39.97	1.9205	2 32 36.1	13.663	17	14 1 16.03	2.0941	8 38 15.9	13.890
18	12 27 35.25	1.9222	2 18 55.5	13.690	18	14 3 21.85	2.0996	8 52 8.6	13.866
19	12 29 30.64	1.9241	2 5 13.3	13.716	19	14 5 28.01	2.1055	9 5 59.8	13.842
20	12 31 26.14	1.9260	1 51 29.5	13.742	20	14 7 34.52	2.1113	9 19 49.5	13.816
21	12 33 21.76	1.9280	1 37 44.2	13.767	21	14 9 41.37	2.1172	9 33 37.7	13.789
22	12 35 17.50	1.9300	1 23 57.5	13.791	22	14 11 48.58	2.1231	9 47 24.2	13.759
23	12 37 13.37	1.9321	1 10 9.4	13.814	23	14 13 56.15	2.1291	10 1 8.8	13.728
24	12 39 9.36	1.9343	N. 0° 56' 19.8"	13.837	24	14 16 4.07	2.1351	S. 10 14 51.6	13.697

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
MONDAY 17.					WEDNESDAY 19.				
0	14 16 4.07	2.1351	S. 10° 14' 51.6"	13.697	0	16 6 47.52	2.4948	S. 20° 3' 46.7"	10.136
1	14 18 12.36	2.1413	10 28 32.5	13.664	1	16 9 17.45	2.5098	20 13 51.2	10.013
2	14 20 21.03	2.1477	10 42 11.3	13.789	2	16 11 47.86	2.5108	20 23 48.2	9.889
3	14 22 30.09	2.1541	10 55 47.9	13.592	3	16 14 18.75	2.5188	20 33 37.8	9.763
4	14 24 39.52	2.1604	11 9 22.3	13.554	4	16 16 50.12	2.5268	20 43 19.8	9.636
5	14 26 49.34	2.1668	11 22 54.4	13.514	5	16 19 21.97	2.5348	20 52 54.1	9.507
6	14 28 59.54	2.1733	11 36 24.0	13.479	6	16 21 54.30	2.5428	21 2 20.7	9.376
7	14 31 10.14	2.1800	11 49 51.1	13.430	7	16 24 27.10	2.5506	21 11 39.3	9.243
8	14 33 21.14	2.1867	12 3 15.6	13.386	8	16 27 0.37	2.5584	21 20 49.7	9.106
9	14 35 32.55	2.1935	12 16 37.5	13.340	9	16 29 34.10	2.5661	21 29 51.9	8.968
10	14 37 44.37	2.2004	12 29 56.6	13.292	10	16 32 8.30	2.5739	21 38 45.3	8.829
11	14 39 56.60	2.2072	12 43 12.7	13.242	11	16 34 42.96	2.5816	21 47 31.3	8.688
12	14 42 9.23	2.2141	12 56 25.7	13.192	12	16 37 18.08	2.5891	21 56 8.4	8.545
13	14 44 22.28	2.2211	13 9 35.7	13.140	13	16 39 53.65	2.5966	22 4 36.8	8.399
14	14 46 35.76	2.2283	13 22 42.5	13.086	14	16 42 29.67	2.6041	22 12 56.3	8.251
15	14 48 49.68	2.2355	13 35 46.0	13.030	15	16 45 6.14	2.6115	22 21 6.9	8.108
16	14 51 4.03	2.2427	13 48 46.1	12.972	16	16 47 43.05	2.6188	22 29 8.5	7.961
17	14 53 18.81	2.2499	14 1 42.7	12.913	17	16 50 20.39	2.6269	22 37 1.0	7.799
18	14 55 34.02	2.2572	14 14 35.7	12.852	18	16 52 58.15	2.6339	22 44 44.4	7.645
19	14 57 49.68	2.2647	14 27 24.9	12.789	19	16 55 36.34	2.6400	22 52 18.5	7.489
20	15 0 5.79	2.2721	14 40 10.3	12.724	20	16 58 14.95	2.6470	22 59 43.0	7.336
21	15 2 22.34	2.2795	14 52 51.8	12.657	21	17 0 53.98	2.6539	23 6 57.8	7.186
22	15 4 39.34	2.2871	15 5 29.2	12.588	22	17 3 33.41	2.6606	23 14 3.0	7.037
23	15 6 56.80	2.2948	S. 15 18 2.4	12.518	23	17 6 13.24	2.6672	S. 23 20 58.6	6.885
TUESDAY 18.					THURSDAY 20.				
0	15 9 14.72	2.3025	S. 15 30 31.4	12.446	0	17 8 53.47	2.6737	S. 23 27 44.4	6.680
1	15 11 33.10	2.3102	15 42 56.0	12.372	1	17 11 34.08	2.6801	23 34 20.2	6.513
2	15 13 51.94	2.3179	15 55 16.1	12.296	2	17 14 15.07	2.6864	23 40 45.8	6.342
3	15 16 11.25	2.3256	16 7 31.6	12.219	3	17 16 56.44	2.6925	23 47 1.1	6.170
4	15 18 31.02	2.3335	16 19 42.4	12.140	4	17 19 38.17	2.6984	23 53 6.2	5.999
5	15 20 51.27	2.3414	16 31 48.4	12.059	5	17 22 20.25	2.7043	23 59 1.0	5.827
6	15 23 11.99	2.3493	16 43 49.4	11.975	6	17 25 2.68	2.7100	24 4 45.5	5.653
7	15 25 33.19	2.3572	16 55 45.4	11.890	7	17 27 45.45	2.7156	24 10 19.4	5.476
8	15 27 54.86	2.3652	17 7 36.2	11.802	8	17 30 28.55	2.7210	24 15 42.6	5.297
9	15 30 17.01	2.3732	17 19 21.6	11.712	9	17 33 11.97	2.7263	24 20 55.0	5.118
10	15 32 39.64	2.3812	17 31 1.6	11.621	10	17 35 55.70	2.7314	24 25 56.7	4.938
11	15 35 2.75	2.3892	17 42 36.1	11.528	11	17 38 39.74	2.7364	24 30 47.5	4.756
12	15 37 26.35	2.3973	17 54 5.0	11.433	12	17 41 24.07	2.7413	24 35 27.4	4.572
13	15 39 50.43	2.4054	18 5 28.1	11.336	13	17 44 8.69	2.7460	24 39 56.2	4.387
14	15 42 15.00	2.4136	18 16 45.3	11.237	14	17 46 53.58	2.7504	24 44 13.9	4.201
15	15 44 40.06	2.4217	18 27 56.5	11.135	15	17 49 38.73	2.7546	24 48 20.4	4.015
16	15 47 5.61	2.4298	18 39 1.5	11.031	16	17 52 24.13	2.7588	24 52 15.7	3.827
17	15 49 31.64	2.4379	18 50 0.3	10.927	17	17 55 9.78	2.7628	24 55 59.7	3.638
18	15 51 58.16	2.4461	19 0 52.8	10.821	18	17 57 55.67	2.7668	24 59 32.3	3.448
19	15 54 25.17	2.4542	19 11 38.8	10.711	19	18 0 41.78	2.7702	25 2 53.4	3.257
20	15 56 52.67	2.4623	19 22 18.1	10.599	20	18 3 28.09	2.7736	25 6 3.0	3.066
21	15 59 20.65	2.4704	19 32 50.6	10.485	21	18 6 14.59	2.7769	25 9 1.2	2.873
22	16 1 49.12	2.4786	19 43 16.3	10.370	22	18 9 1.28	2.7798	25 11 47.8	2.679
23	16 4 18.08	2.4867	19 53 35.0	10.254	23	18 11 48.15	2.7826	25 14 22.7	2.483
24	16 6 47.52	2.4948	S. 20 3 46.7	10.136	24	18 14 35.20	2.7852	S. 25 16 45.8	2.287

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
FRIDAY 21.					SUNDAY 23.				
0	18 14 35.20	2.7852	S. 25° 16' 45.8"	2.987	0	20 27 28.55	2.5797	S. 23° 21' 3.9"	6.873
1	18 17 22.40	2.7876	25 18 57.2	2.092	1	20 30 9.14	2.5734	23 14 6.5	7.039
2	18 20 9.73	2.7898	25 20 56.9	1.896	2	20 32 49.34	2.5669	23 6 59.2	7.203
3	18 22 57.17	2.7918	25 22 44.8	1.700	3	20 35 29.16	2.5605	22 59 42.1	7.366
4	18 25 44.73	2.7937	25 24 20.9	1.502	4	20 38 8.50	2.5538	22 52 15.2	7.527
5	18 28 32.41	2.7954	25 25 45.1	1.303	5	20 40 47.61	2.5470	22 44 38.8	7.686
6	18 31 20.19	2.7969	25 26 57.3	1.104	6	20 43 26.23	2.5402	22 36 52.9	7.844
7	18 34 8.05	2.7981	25 27 57.6	0.906	7	20 46 4.44	2.5333	22 28 57.6	8.000
8	18 36 55.97	2.7990	25 28 46.0	0.707	8	20 48 42.23	2.5264	22 20 53.0	8.155
9	18 39 43.93	2.7997	25 29 22.5	0.508	9	20 51 19.61	2.5194	22 12 39.1	8.307
10	18 42 31.93	2.8003	25 29 47.0	0.308	10	20 53 56.56	2.5123	22 4 16.2	8.456
11	18 45 19.97	2.8008	25 29 59.5	-0.109	11	20 56 33.08	2.5050	21 55 44.4	8.603
12	18 48 8.04	2.8011	25 30 0.1	+0.090	12	20 59 9.16	2.5077	21 47 3.8	8.750
13	18 50 56.11	2.8010	25 29 48.7	0.290	13	21 1 44.80	2.5004	21 38 14.5	8.895
14	18 53 44.16	2.8007	25 29 25.3	0.490	14	21 4 20.00	2.5030	21 29 16.4	9.038
15	18 56 32.18	2.8002	25 28 49.8	0.690	15	21 6 54.76	2.5755	21 20 9.8	9.179
16	18 59 20.17	2.7996	25 28 2.4	0.889	16	21 9 29.07	2.5690	21 10 54.9	9.318
17	19 2 8.12	2.7988	25 27 3.1	1.088	17	21 12 2.92	2.5605	21 1 31.7	9.455
18	19 4 56.03	2.7978	25 25 51.9	1.287	18	21 14 36.32	2.5529	20 52 0.4	9.590
19	19 7 43.87	2.7965	25 24 28.7	1.486	19	21 17 9.26	2.5459	20 42 21.0	9.723
20	19 10 31.61	2.7949	25 22 53.6	1.683	20	21 19 41.74	2.5375	20 32 33.7	9.853
21	19 13 19.24	2.7931	25 21 6.7	1.881	21	21 22 13.77	2.5289	20 22 38.7	9.981
22	19 16 6.77	2.7912	25 19 7.9	2.078	22	21 24 45.33	2.5221	20 12 36.0	10.108
23	19 18 54.19	2.7891	S. 25° 16' 57.3"	2.274	23	21 27 16.43	2.5144	S. 20° 2' 25.8"	10.233
SATURDAY 22.					MONDAY 24.				
0	19 21 41.49	2.7880	S. 25° 14' 35.0"	2.470	0	21 29 47.06	2.5065	S. 19° 52' 8.0"	10.357
1	19 24 28.64	2.7845	25 12 0.9	2.666	1	21 32 17.22	2.4987	19 41 42.9	10.478
2	19 27 15.63	2.7818	25 9 15.1	2.862	2	21 34 46.91	2.4910	19 31 10.7	10.596
3	19 30 2.45	2.7788	25 6 17.5	3.056	3	21 37 16.14	2.4832	19 20 31.4	10.713
4	19 32 49.09	2.7758	25 3 8.3	3.249	4	21 39 44.90	2.4754	19 9 45.1	10.828
5	19 35 35.54	2.7726	24 59 47.6	3.440	5	21 42 13.18	2.4675	18 58 52.0	10.940
6	19 38 21.80	2.7692	24 56 15.5	3.631	6	21 44 40.99	2.4596	18 47 52.3	11.050
7	19 41 7.85	2.7656	24 52 31.9	3.822	7	21 47 8.33	2.4518	18 36 46.0	11.160
8	19 43 53.67	2.7618	24 48 36.9	4.012	8	21 49 35.21	2.4440	18 25 33.1	11.268
9	19 46 39.26	2.7578	24 44 30.5	4.201	9	21 52 1.62	2.4362	18 14 13.8	11.373
10	19 49 24.60	2.7536	24 40 12.8	4.388	10	21 54 27.56	2.4284	18 2 48.3	11.476
11	19 52 9.69	2.7494	24 35 44.0	4.574	11	21 56 53.03	2.4206	17 51 16.8	11.577
12	19 54 54.53	2.7450	24 31 4.0	4.759	12	21 59 18.04	2.4129	17 39 39.2	11.676
13	19 57 39.09	2.7403	24 26 12.9	4.943	13	22 1 42.58	2.4052	17 27 55.7	11.773
14	20 0 23.36	2.7355	24 21 10.9	5.125	14	22 4 6.66	2.3975	17 16 6.5	11.868
15	20 3 7.34	2.7305	24 15 57.9	5.307	15	22 6 30.28	2.3898	17 4 11.7	11.961
16	20 5 51.02	2.7254	24 10 34.1	5.487	16	22 8 53.44	2.3821	16 52 11.3	12.052
17	20 8 34.38	2.7201	24 4 59.5	5.665	17	22 11 16.14	2.3744	16 40 5.4	12.141
18	20 11 17.43	2.7147	23 59 14.3	5.841	18	22 13 38.37	2.3667	16 27 54.3	12.228
19	20 14 0.15	2.7092	23 53 18.5	6.017	19	22 16 0.15	2.3592	16 15 38.0	12.314
20	20 16 42.53	2.7035	23 47 12.2	6.191	20	22 18 21.48	2.3516	16 3 16.6	12.398
21	20 19 24.57	2.6977	23 40 55.5	6.364	21	22 20 42.37	2.3444	15 50 50.3	12.480
22	20 22 6.25	2.6918	23 34 28.5	6.535	22	22 23 2.81	2.3369	15 38 19.1	12.559
23	20 24 47.58	2.6858	23 27 51.3	6.705	23	22 25 22.80	2.3295	15 25 43.3	12.636
24	20 27 28.55	2.6797	S. 23° 21' 3.9"	6.873	24	22 27 42.35	2.3221	S. 15° 13' 2.8"	12.713

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
TUESDAY 25.					THURSDAY 27.				
0	22 27 42.35	2.3221	S. 15° 13' 2.8"	12.713	0	0 11 57.21	2.0509	S. 4° 7' 31.4"	14.435
1	22 30 1.46	2.3148	15 0 17.8	12.786	1	0 14 0.15	2.0473	3 53 5.2	14.438
2	22 32 20.13	2.3076	14 47 28.5	12.858	2	0 16 2.88	2.0437	3 38 38.9	14.439
3	22 34 38.37	2.3004	14 34 34.8	12.929	3	0 18 5.39	2.0402	3 24 12.5	14.439
4	22 36 56.18	2.2933	14 21 36.9	12.998	4	0 20 7.70	2.0367	3 9 46.2	14.437
5	22 39 13.57	2.2862	14 8 35.1	13.065	5	0 22 9.80	2.0333	2 55 20.1	14.434
6	22 41 30.53	2.2792	13 55 29.3	13.130	6	0 24 11.69	2.0300	2 40 54.2	14.430
7	22 43 47.07	2.2722	13 42 19.7	13.194	7	0 26 13.39	2.0268	2 26 28.6	14.424
8	22 46 3.20	2.2653	13 29 6.3	13.256	8	0 28 14.91	2.0238	2 12 3.3	14.418
9	22 48 18.91	2.2585	13 15 49.1	13.316	9	0 30 16.25	2.0208	1 57 38.4	14.411
10	22 50 34.22	2.2518	13 2 28.4	13.373	10	0 32 17.41	2.0179	1 43 14.0	14.402
11	22 52 49.13	2.2451	12 49 4.4	13.428	11	0 34 18.40	2.0150	1 28 50.2	14.393
12	22 55 3.63	2.2384	12 35 37.2	13.482	12	0 36 19.21	2.0122	1 14 26.9	14.383
13	22 57 17.74	2.2318	12 22 6.7	13.535	13	0 38 19.86	2.0096	1 0 4.3	14.371
14	22 59 31.46	2.2253	12 8 33.1	13.587	14	0 40 20.36	2.0070	0 45 42.5	14.358
15	23 1 44.78	2.2189	11 54 56.3	13.637	15	0 42 20.70	2.0045	0 31 21.4	14.345
16	23 3 57.72	2.2126	11 41 16.6	13.685	16	0 44 20.89	2.0020	0 17 1.2	14.330
17	23 6 10.29	2.2063	11 27 34.2	13.731	17	0 46 20.94	1.9997	S. 0 2 41.9	14.315
18	23 8 22.48	2.2001	11 13 49.0	13.775	18	0 48 20.85	1.9974	N. 0 11 36.5	14.298
19	23 10 34.30	2.1939	11 0 1.2	13.818	19	0 50 20.62	1.9952	0 25 53.8	14.279
20	23 12 45.75	2.1878	10 46 10.9	13.860	20	0 52 20.27	1.9931	0 40 10.0	14.260
21	23 14 56.84	2.1818	10 32 18.0	13.900	21	0 54 19.79	1.9910	0 54 25.0	14.240
22	23 17 7.57	2.1759	10 18 22.8	13.938	22	0 56 19.19	1.9891	1 8 38.8	14.220
23	23 19 17.95	2.1701	S. 10 4 25.4	13.974	23	0 58 18.48	1.9873	N. 1 22 51.3	14.199
WEDNESDAY 26.					FRIDAY 28.				
0	23 21 27.99	2.1644	S. 9 50 25.9	14.010	0	1 0 17.66	1.9854	N. 1 37 2.6	14.176
1	23 23 37.68	2.1587	9 36 24.3	14.044	1	1 2 16.73	1.9837	1 51 12.5	14.152
2	23 25 47.03	2.1531	9 22 20.7	14.077	2	1 4 15.70	1.9821	2 5 20.9	14.127
3	23 27 56.05	2.1476	9 8 15.1	14.108	3	1 6 14.58	1.9806	2 19 27.7	14.101
4	23 30 4.74	2.1422	8 54 7.7	14.137	4	1 8 13.37	1.9791	2 33 33.0	14.075
5	23 32 13.11	2.1368	8 30 58.7	14.164	5	1 10 12.07	1.9776	2 47 36.7	14.048
6	23 34 21.16	2.1316	8 25 48.1	14.190	6	1 12 10.68	1.9763	3 1 38.8	14.020
7	23 36 28.90	2.1264	8 11 35.9	14.215	7	1 14 9.22	1.9751	3 15 39.1	13.991
8	23 38 36.33	2.1212	7 57 22.3	14.239	8	1 16 7.69	1.9739	3 29 37.6	13.961
9	23 40 43.45	2.1162	7 43 7.2	14.262	9	1 18 6.08	1.9727	3 43 34.4	13.930
10	23 42 50.27	2.1112	7 28 50.8	14.283	10	1 20 4.41	1.9717	3 57 29.3	13.898
11	23 44 56.80	2.1064	7 14 33.3	14.302	11	1 22 2.68	1.9708	4 11 22.2	13.864
12	23 47 3.04	2.1016	7 0 14.7	14.320	12	1 24 0.90	1.9699	4 25 13.0	13.830
13	23 49 9.00	2.0970	6 45 55.1	14.337	13	1 25 59.07	1.9691	4 39 1.8	13.796
14	23 51 14.68	2.0924	6 31 34.4	14.353	14	1 27 57.19	1.9683	4 52 48.5	13.762
15	23 53 20.08	2.0878	6 17 12.8	14.367	15	1 29 55.26	1.9676	5 6 33.2	13.726
16	23 55 25.21	2.0834	6 2 50.4	14.379	16	1 31 53.30	1.9671	5 20 15.7	13.688
17	23 57 30.08	2.0790	5 48 27.3	14.391	17	1 33 51.31	1.9665	5 33 55.8	13.649
18	23 59 34.69	2.0748	5 34 3.5	14.402	18	1 35 49.28	1.9660	5 47 33.5	13.610
19	0 1 39.05	2.0706	5 19 39.1	14.411	19	1 37 47.23	1.9657	6 1 8.9	13.571
20	0 3 43.16	2.0664	5 5 14.3	14.418	20	1 39 45.16	1.9654	6 14 41.9	13.531
21	0 5 47.02	2.0624	4 50 49.0	14.424	21	1 41 43.07	1.9651	6 28 12.6	13.490
22	0 7 50.65	2.0585	4 36 23.3	14.429	22	1 43 40.97	1.9649	6 41 40.8	13.448
23	0 9 54.05	2.0547	4 21 57.4	14.433	23	1 45 38.86	1.9647	6 55 6.3	13.404
24	0 11 57.21	2.0509	S. 4 7 31.4	14.435	24	1 47 36.73	1.9645	N. 7 8 29.1	13.358

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SATURDAY 29.					SUNDAY 30.				
0	1 47 36.73	1.9645	N. 7° 8' 29.1"	13.358	0	2 34 54.23	1.9618	N. 12° 14' 28.8"	12.064
1	1 49 34.60	1.9646	7 21 49.3	13.314	1	2 36 53.18	1.9629	12 26 30.7	12.000
2	1 51 32.48	1.9648	7 35 6.8	13.270	2	2 38 52.22	1.9647	12 38 28.8	11.936
3	1 53 30.38	1.9651	7 48 21.6	13.224	3	2 40 51.35	1.9662	12 50 23.0	11.870
4	1 55 28.29	1.9652	8 1 33.6	13.176	4	2 42 50.57	1.9678	13 2 13.2	11.804
5	1 57 26.21	1.9654	8 14 42.7	13.128	5	2 44 49.89	1.9694	13 13 59.4	11.738
6	1 59 24.14	1.9657	8 27 48.9	13.079	6	2 46 49.30	1.9910	13 25 41.7	11.671
7	2 1 22.10	1.9662	8 40 52.1	13.030	7	2 48 48.81	1.9927	13 37 19.9	11.602
8	2 3 20.09	1.9666	8 53 52.4	12.980	8	2 50 48.43	1.9944	13 48 53.9	11.532
9	2 5 18.10	1.9670	9 6 49.6	12.928	9	2 52 48.15	1.9962	14 0 23.7	11.462
10	2 7 16.14	1.9676	9 19 43.7	12.875	10	2 54 47.98	1.9980	14 11 49.3	11.392
11	2 9 14.22	1.9684	9 32 34.6	12.822	11	2 56 47.92	1.9998	14 23 10.7	11.322
12	2 11 12.35	1.9691	9 45 22.3	12.769	12	2 58 47.96	2.0017	14 34 27.9	11.250
13	2 13 10.52	1.9699	9 58 6.8	12.715	13	3 0 48.12	2.0037	14 45 40.7	11.176
14	2 15 8.74	1.9706	10 10 48.0	12.660	14	3 2 48.40	2.0057	14 56 49.1	11.102
15	2 17 7.00	1.9715	10 23 25.9	12.604	15	3 4 48.80	2.0077	15 7 53.0	11.028
16	2 19 5.32	1.9725	10 36 0.4	12.547	16	3 6 49.32	2.0097	15 18 52.4	10.953
17	2 21 3.70	1.9735	10 48 31.4	12.489	17	3 8 49.96	2.0117	15 29 47.3	10.878
18	2 23 2.14	1.9745	11 0 59.0	12.431	18	3 10 50.73	2.0138	15 40 37.7	10.802
19	2 25 0.64	1.9756	11 13 23.1	12.372	19	3 12 51.62	2.0159	15 51 23.5	10.724
20	2 26 59.21	1.9767	11 25 43.6	12.312	20	3 14 52.64	2.0181	16 2 4.6	10.645
21	2 28 57.85	1.9779	11 38 0.4	12.251	21	3 16 53.80	2.0204	16 12 40.9	10.566
22	2 30 56.57	1.9792	11 50 13.6	12.189	22	3 18 55.09	2.0226	16 23 12.5	10.487
23	2 32 55.36	1.9805	12 2 23.1	12.127	23	3 20 56.51	2.0248	16 33 39.3	10.407
24	2 34 54.23	1.9818	N. 12° 14' 28.8"	12.064	24	3 22 58.07	2.0271	N. 16° 44' 1.4"	10.327

PHASES OF THE MOON.

● New Moon,	d	h	m
☾ First Quarter,	5	15	23.5
○ Full Moon,	13	19	19.1
☾ Last Quarter,	20	18	58.0
	27	9	27.6

☾ Apogee,	d	h
☾ Perigee,	9	3.4
	21	16.2

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.		Noon.	P. L. of Diff.	III <sup>h</sup> .	P. L. of Diff.	VI <sup>h</sup> .	P. L. of Diff.	IX <sup>h</sup> .	P. L. of Diff.
1	Saturn	W.	87 7 39	2652	88 45 24	2662	90 22 55	2672	92 0 12	2682
	α Aquilæ	W.	81 22 53	3449	82 44 14	3453	84 5 31	3458	85 26 42	3464
	Fomalhaut	W.	47 13 15	2978	48 43 55	2973	50 14 42	2969	51 45 34	2966
	α Pegasi	W.	34 47 57	4248	35 55 38	4135	37 5 6	4038	38 16 8	3953
	Sun	E.	53 47 4	2991	52 16 40	3001	50 46 29	3013	49 16 32	3022
2	Saturn	W.	100 3 29	2728	101 39 32	2738	103 15 22	2746	104 51 1	2755
	α Aquilæ	W.	92 10 32	3509	93 30 46	3521	94 50 47	3534	96 10 34	3546
	Fomalhaut	W.	59 20 23	2965	60 51 19	2967	62 22 13	2970	63 53 3	2973
	α Pegasi	W.	44 29 41	3658	45 47 13	3617	47 5 29	3582	48 24 23	3551
	Sun	E.	41 49 54	3073	40 21 11	3082	38 52 40	3092	37 24 21	3102
3	Fomalhaut	W.	71 26 8	2994	72 56 28	2999	74 26 42	3005	75 56 49	3009
	α Pegasi	W.	55 6 14	3449	56 27 43	3428	57 49 28	3415	59 11 28	3404
	Sun	E.	30 5 30	3148	28 38 28	3157	27 11 27	3166	25 44 37	3175
7	Sun	W.	15 6 47	3386	16 29 20	3390	17 51 48	3394	19 14 11	3400
	Regulus	E.	56 4 9	3045	54 34 52	3051	53 5 42	3056	51 36 30	3061
8	Sun	W.	26 4 46	3421	27 26 39	3424	28 48 28	3427	30 10 14	3431
	Regulus	E.	44 13 1	3087	42 44 36	3092	41 16 17	3097	39 48 4	3103
	Spica	E.	98 16 26	3082	96 47 55	3085	95 19 27	3088	93 51 3	3091
9	Sun	W.	36 58 18	3440	38 19 49	3442	39 41 18	3443	41 2 46	3444
	Regulus	E.	32 28 32	3128	31 0 56	3134	29 33 28	3140	28 6 7	3146
	Spica	E.	86 29 48	3101	85 1 40	3102	83 33 33	3103	82 5 27	3104
10	Sun	W.	47 50 5	3441	49 11 35	3439	50 33 7	3437	51 54 42	3435
	Pollux	W.	16 10 28	3167	17 37 17	3151	19 4 25	3138	20 31 49	3128
	Spica	E.	74 45 3	3103	73 16 57	3101	71 48 49	3101	70 20 40	3099
	Antares	E.	120 39 16	3098	119 11 4	3096	117 42 49	3093	116 14 31	3091
11	Sun	W.	58 43 25	3416	60 5 23	3411	61 27 27	3406	62 49 37	3400
	Pollux	W.	27 51 36	3086	29 20 3	3078	30 48 39	3071	32 17 24	3064
	Jupiter	W.	19 56 37	3185	21 23 4	3173	22 49 45	3162	24 16 40	3151
	Spica	E.	62 59 15	3085	61 30 47	3082	60 2 15	3078	58 33 38	3073
	Antares	E.	108 52 3	3072	107 23 19	3066	105 54 28	3061	104 25 31	3056
12	Sun	W.	69 42 17	3364	71 5 15	3355	72 28 23	3346	73 51 41	3337
	Pollux	W.	39 43 31	3023	41 13 15	3014	42 43 11	3005	44 13 18	2995
	Jupiter	W.	31 34 17	3102	33 2 24	3092	34 30 43	3082	35 59 15	3072
	Spica	E.	51 9 6	3047	49 39 52	3041	48 10 30	3034	46 41 0	3028
	Antares	E.	96 58 53	3022	95 29 7	3014	93 59 11	3005	92 29 5	2997
13	Sun	W.	80 51 8	3282	82 15 40	3270	83 40 27	3257	85 5 29	3244
	Pollux	W.	51 47 3	2941	53 18 30	2930	54 50 11	2917	56 22 8	2905
	Jupiter	W.	43 25 11	3015	44 55 5	3003	46 25 14	2991	47 55 38	2977
	Regulus	W.	16 10 38	3105	17 38 42	3068	19 7 31	3035	20 37 0	3005
	Spica	E.	39 11 28	2994	37 41 8	2988	36 10 40	2981	34 40 4	2975
	Antares	E.	84 55 38	2946	83 24 17	2935	81 52 43	2924	80 20 54	2911
14	Sun	W.	92 14 41	3172	93 41 24	3156	95 8 26	3140	96 35 47	3124
	Pollux	W.	64 6 0	2837	65 39 40	2822	67 13 39	2808	68 47 57	2792
	Jupiter	W.	55 31 54	2908	57 4 3	2892	58 36 32	2877	60 9 20	2862
	Regulus	W.	28 12 42	2889	29 45 15	2869	31 18 13	2849	32 51 37	2831

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.		Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
1	Saturn	W.	93 37 16	2691	95 14 8	2701	96 50 47	2710	98 27 14	2719
	α Aquilæ	W.	86 47 46	3471	88 8 42	3480	89 20 29	3488	90 50 6	3498
	Fomalhaut	W.	53 16 29	2964	54 47 27	2963	56 18 26	2963	57 49 25	2964
	α Pegasi	W.	39 28 34	3878	40 42 16	3812	41 57 6	3753	43 12 57	3703
	SUN	E.	47 46 47	3033	46 17 15	3043	44 47 56	3053	43 18 49	3063
2	Saturn	W.	106 26 28	2764	108 1 43	2773	109 36 47	2781	111 11 40	2789
	α Aquilæ	W.	97 30 7	3561	98 49 24	3577	100 8 23	3594	101 27 4	3610
	Fomalhaut	W.	65 23 50	2977	66 54 32	2980	68 25 10	2985	69 55 42	2989
	α Pegasi	W.	49 43 51	3523	51 3 50	3499	52 24 15	3478	53 45 4	3459
	SUN	E.	35 56 14	3111	34 28 18	3121	33 0 34	3130	31 33 1	3139
3	Fomalhaut	W.	77 26 50	3016	78 56 43	3022	80 26 28	3028	81 56 6	3034
	α Pegasi	W.	60 33 40	3395	61 56 2	3386	63 18 34	3379	64 41 14	3374
	SUN	E.	24 17 58	3183	22 51 29	3193	21 25 11	3201	19 50 3	3209
7	SUN	W.	20 36 28	3405	21 58 39	3408	23 20 46	3413	24 42 48	3416
	Regulus	E.	50 7 42	3067	48 38 52	3073	47 10 9	3078	45 41 32	3082
8	SUN	W.	31 31 56	3433	32 53 35	3436	34 15 11	3438	35 36 45	3438
	Regulus	E.	38 19 58	3107	36 51 57	3113	35 24 3	3117	33 56 14	3123
	Spica	E.	92 22 43	3094	90 54 26	3096	89 26 11	3097	87 57 58	3100
9	SUN	W.	42 24 13	3444	43 45 40	3443	45 7 8	3443	46 28 36	3442
	Regulus	E.	26 38 55	3155	25 11 52	3163	23 44 59	3173	22 18 18	3186
	Spica	E.	80 37 22	3105	79 9 18	3104	77 41 13	3104	76 13 8	3104
10	SUN	W.	53 16 19	3431	54 38 0	3429	55 59 44	3425	57 21 32	3421
	Pollux	W.	21 59 25	3118	23 27 13	3110	24 55 11	3101	26 23 19	3094
	Spica	E.	68 52 29	3097	67 24 16	3094	65 55 59	3081	64 27 39	3088
	Antares	E.	114 46 10	3087	113 17 45	3084	111 49 16	3080	110 20 42	3076
11	SUN	W.	64 11 54	3393	65 34 18	3387	66 56 49	3379	68 19 29	3372
	Pollux	W.	33 46 18	3056	35 15 22	3048	36 44 35	3040	38 13 58	3032
	Jupiter	W.	25 43 48	3141	27 11 8	3132	28 38 39	3122	30 6 22	3112
	Spica	E.	57 4 56	3069	55 36 8	3064	54 7 14	3058	52 38 13	3053
	Antares	E.	102 56 27	3050	101 27 16	3043	99 57 57	3036	98 28 29	3030
12	SUN	W.	75 15 10	3326	76 38 51	3316	78 2 44	3306	79 26 49	3294
	Pollux	W.	45 43 37	2985	47 14 8	2974	48 44 53	2964	50 15 51	2953
	Jupiter	W.	37 27 59	3061	38 56 56	3050	40 26 7	3039	41 55 32	3027
	Spica	E.	45 11 22	3022	43 41 36	3015	42 11 42	3008	40 41 39	3001
	Antares	E.	90 58 48	2987	89 28 19	2977	87 57 38	2968	86 26 45	2957
13	SUN	W.	86 30 46	3231	87 56 19	3216	89 22 9	3202	90 48 16	3187
	Pollux	W.	57 54 20	2992	59 26 49	2979	60 59 35	2965	62 32 39	2952
	Jupiter	W.	49 26 19	2964	50 57 17	2950	52 28 32	2937	54 0 4	2923
	Regulus	W.	22 7 6	2978	23 37 46	2954	25 8 56	2931	26 40 35	2909
	Spica	E.	33 9 20	2970	31 38 30	2965	30 7 33	2960	28 36 30	2958
	Antares	E.	78 48 49	2989	77 16 29	2986	75 43 52	2974	74 10 59	2959
14	SUN	W.	98 3 28	3106	99 31 30	3090	100 59 52	3072	102 28 36	3055
	Pollux	W.	70 22 36	2776	71 57 35	2760	73 32 56	2744	75 8 38	2727
	Jupiter	W.	61 42 28	2845	63 15 57	2829	64 49 47	2812	66 23 59	2795
	Regulus	W.	34 25 25	2811	35 59 39	2792	37 34 17	2773	39 9 20	2754



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Diff.	III <sup>h</sup> .	P. L. of Diff.	VI <sup>h</sup> .	P. L. of Diff.	IX <sup>h</sup> .	P. L. of Diff.
14	Spica E.	27° 5' 24"	2856	25° 34' 16"	2858	24° 3' 11"	2892	22° 32' 10"	2869
	Antares E.	72 37 48	2845	71 4 19	2831	69 30 32	2818	67 56 27	2803
	Saturn E.	113 42 14	2816	112 8 7	2801	110 33 40	2786	108 58 54	2770
15	Sun W.	103 57 41	3036	105 27 9	3018	106 56 59	3000	108 27 12	2981
	Pollux W.	76 44 42	2710	78 21 9	2693	79 57 58	2676	81 35 10	2658
	Jupiter W.	67 58 33	2779	69 33 29	2761	71 8 48	2744	72 44 30	2726
	Regulus W.	40 44 48	2735	42 20 41	2718	43 56 59	2697	45 33 43	2678
	Antares E.	60 1 2	2725	58 24 55	2708	56 48 26	2692	55 11 35	2675
	Saturn E.	100 59 50	2689	99 22 56	2679	97 45 39	2655	96 7 59	2638
	α Aquilæ E.	106 1 8	3544	104 41 32	3515	103 21 24	3486	102 0 44	3459
16	Sun W.	116 4 19	2883	117 36 59	2864	119 10 4	2844	120 43 35	2824
	Pollux W.	89 47 13	2568	91 26 52	2549	93 6 57	2530	94 47 28	2512
	Jupiter W.	80 49 2	2634	82 27 11	2615	84 5 46	2598	85 44 47	2577
	Regulus W.	53 43 48	2589	55 23 8	2563	57 2 54	2543	58 43 8	2524
	Antares E.	47 1 44	2591	45 22 37	2575	43 43 8	2559	42 3 16	2543
	Saturn E.	87 53 36	2548	86 13 29	2539	84 32 56	2510	82 51 57	2492
	α Aquilæ E.	95 10 5	3337	93 46 36	3314	92 22 41	3294	90 58 23	3275
17	Pollux W.	103 16 31	2419	104 59 39	2401	106 43 13	2382	108 27 13	2364
	Jupiter W.	94 6 21	2469	95 47 59	2464	97 30 3	2445	99 12 34	2426
	Regulus W.	67 10 58	2427	68 53 54	2409	70 37 16	2390	72 21 5	2371
	Spica W.	14 9 56	2818	15 44 1	2790	17 20 14	2644	18 58 9	2581
	Antares E.	33 38 27	2467	31 56 27	2454	30 14 9	2443	28 31 35	2432
	Saturn E.	74 20 32	2399	72 36 56	2381	70 52 54	2362	69 8 25	2344
	α Aquilæ E.	83 51 36	3194	82 25 20	3183	80 58 50	3172	79 32 7	3163
18	Jupiter W.	107 51 47	2335	109 36 55	2319	111 22 27	2302	113 8 23	2287
	Regulus W.	81 6 49	2281	82 53 16	2264	84 40 8	2247	86 27 25	2231
	Spica W.	27 25 23	2380	29 9 27	2350	30 54 13	2324	32 39 38	2299
	Saturn E.	60 19 33	2258	58 32 31	2241	56 45 5	2225	54 57 14	2209
	α Aquilæ E.	72 16 25	3143	70 49 7	3144	69 21 51	3149	67 54 41	3158
	Fomalhaut E.	102 46 35	2446	101 4 6	2426	99 21 9	2408	97 37 45	2389
19	Regulus W.	95 29 41	2157	97 19 14	2143	99 9 8	2130	100 59 22	2118
	Spica W.	41 35 4	2196	43 23 37	2179	45 12 36	2163	47 1 59	2148
	Saturn E.	45 52 20	2137	44 2 18	2125	42 11 57	2113	40 21 18	2102
	α Aquilæ E.	60 42 23	3244	59 17 6	3273	57 52 23	3308	56 28 21	3349
	Fomalhaut E.	88 54 39	2313	87 8 58	2299	85 22 57	2287	83 36 38	2276
	α Pegasi E.	106 47 58	2593	105 8 54	2579	103 29 20	2552	101 49 19	2533
20	Regulus W.	110 14 53	2066	112 6 45	2057	113 58 50	2050	115 51 7	2043
	Spica W.	56 14 17	2085	58 5 40	2074	59 57 19	2065	61 49 12	2056
	Saturn E.	31 4 11	2080	29 12 10	2056	27 20 3	2053	25 27 51	2052
	α Aquilæ E.	49 42 10	2657	48 24 37	2747	47 8 40	2850	45 54 29	2965
	Fomalhaut E.	74 41 26	2235	72 53 50	2230	71 6 7	2226	69 18 18	2224
	α Pegasi E.	93 23 29	2464	91 41 25	2454	89 59 7	2446	88 16 38	2439
21	Spica W.	71 11 30	2027	73 4 22	2023	74 57 20	2021	76 50 22	2019
	Antares W.	25 24 57	2084	27 16 21	2070	29 8 6	2060	31 0 7	2052
	Fomalhaut E.	60 19 0	2233	58 31 21	2239	56 43 52	2248	54 56 36	2259
	α Pegasi E.	79 42 36	2431	77 59 45	2433	76 16 58	2438	74 34 18	2445
	α Arietis E.	122 23 5	2158	120 33 34	2149	118 43 49	2141	116 53 53	2136

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.		Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXh.	P. L. of Diff.
14	Spica	E.	21° 1' 19"	2983	19° 30' 45"	3005	18° 0' 36"	3036	16° 31' 10"	3081
	Antares	E.	66 22 3	2787	64 47 18	2772	63 12 13	2756	61 36 48	2741
	Saturn	E.	107 23 47	2755	105 48 20	2739	104 12 32	2722	102 36 22	2706
15	Sun	W.	109 57 49	2992	111 28 50	2942	113 0 15	2923	114 32 5	2904
	Pollux	W.	83 12 46	2640	84 50 46	2623	86 29 10	2604	88 7 59	2586
	Jupiter	W.	74 20 36	2707	75 57 6	2689	77 34 0	2671	79 11 19	2653
	Regulus	W.	47 10 52	2659	48 48 27	2640	50 26 28	2621	52 4 55	2601
	Antares	E.	53 34 22	2658	51 56 46	2642	50 18 48	2625	48 40 27	2609
	Saturn	E.	94 29 55	2690	92 51 27	2602	91 12 35	2584	89 33 18	2566
	α Aquilæ	E.	100 39 34	2422	99 17 54	2407	97 55 45	2382	96 33 8	2359
16	Sun	W.	122 17 32	2904	123 51 55	2784	125 26 44	2763	127 2 0	2744
	Pollux	W.	96 28 24	2494	98 9 46	2475	99 51 35	2456	101 33 50	2438
	Jupiter	W.	87 24 13	2559	89 4 5	2539	90 44 24	2520	92 25 9	2501
	Regulus	W.	60 23 48	2504	62 4 55	2485	63 46 29	2466	65 28 30	2447
	Antares	E.	40 23 2	2596	38 42 25	2511	37 1 27	2495	35 20 7	2481
	Saturn	E.	81 10 33	2474	79 28 43	2455	77 46 26	2436	76 3 42	2417
	α Aquilæ	E.	89 33 42	2357	88 8 40	2329	86 43 17	2323	85 17 35	2309
17	Pollux	W.	110 11 40	2346	111 56 33	2298	113 41 51	2311	115 27 35	2294
	Jupiter	W.	100 55 32	2407	102 38 57	2369	104 22 48	2371	106 7 5	2353
	Regulus	W.	74 5 21	2353	75 50 4	2335	77 35 13	2317	79 20 48	2299
	Spica	W.	20 37 30	2530	22 18 2	2485	23 59 36	2446	25 42 5	2412
	Antares	E.	26 48 46	2494	25 5 45	2418	23 22 36	2416	21 39 24	2417
	Saturn	E.	67 23 30	2396	65 38 9	2369	63 52 22	2391	62 6 10	2274
	α Aquilæ	E.	78 5 13	3155	76 38 10	3148	75 10 59	3144	73 43 43	3143
18	Jupiter	W.	114 54 42	2272	116 41 23	2258	118 28 24	2245	120 15 44	2233
	Regulus	W.	88 15 6	2215	90 3 11	2200	91 51 39	2185	93 40 29	2170
	Spica	W.	34 25 39	2276	36 12 14	2254	37 59 21	2234	39 46 58	2214
	Saturn	E.	53 9 0	2194	51 20 23	2178	49 31 23	2165	47 42 2	2151
	α Aquilæ	E.	66 27 41	3168	65 0 53	3181	63 34 21	3198	62 8 9	3220
	Fomalhaut	E.	95 53 55	2372	94 9 40	2356	92 25 2	2340	90 40 1	2326
19	Regulus	W.	102 49 54	2105	104 40 45	2085	106 31 52	2065	108 23 15	2075
	Spica	W.	48 51 45	2134	50 41 53	2120	52 32 22	2107	54 23 11	2096
	Saturn	E.	38 30 22	2092	36 39 10	2082	34 47 43	2073	32 56 3	2066
	α Aquilæ	E.	55 5 6	3385	53 42 44	3448	52 21 22	3509	51 1 8	3578
	Fomalhaut	E.	81 50 3	2266	80 3 13	2256	78 16 9	2248	76 28 53	2241
	α Pegasi	E.	100 8 52	2517	98 28 2	2501	96 46 50	2487	95 5 18	2475
20	Regulus	W.	117 43 34	2037	119 36 11	2022	121 28 55	2006	123 21 46	2024
	Spica	W.	63 41 19	2049	65 33 37	2042	67 26 6	2036	69 18 44	2031
	Saturn	E.	23 35 37	2052	21 43 24	2056	19 51 17	2062	17 59 19	2071
	α Aquilæ	E.	44 42 15	4097	43 32 10	4247	42 24 28	4416	41 19 21	4609
	Fomalhaut	E.	67 30 26	2223	65 42 32	2223	63 54 38	2225	62 6 47	2227
	α Pegasi	E.	86 33 59	2434	84 51 13	2431	83 8 23	2429	81 25 30	2429
21	Spica	W.	78 43 27	2018	80 36 33	2017	82 29 40	2018	84 22 46	2019
	Antares	W.	32 52 21	2045	34 44 45	2041	36 37 16	2037	38 29 52	2036
	Fomalhaut	E.	53 9 36	2272	51 22 55	2267	49 36 36	2265	47 50 44	2266
	α Pegasi	E.	72 51 48	2454	71 9 30	2465	69 27 27	2477	67 45 42	2469
	α Arctis	E.	115 3 48	2120	113 13 34	2126	111 23 15	2124	109 32 52	2122

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Diff.	III <sup>h</sup> .	P. L. of Diff.	VI <sup>h</sup> .	P. L. of Diff.	IX <sup>h</sup> .	P. L. of Diff.
22	Spica W.	86° 15' 50"	2022	88° 8' 50"	2025	90° 1' 46"	2028	91° 54' 36"	2033
	Antares W.	40 22 31	2035	42 15 11	2035	44 7 51	2037	46 0 28	2039
	Fomalhaut E.	46 5 22	2350	44 20 35	2378	42 36 28	2410	40 53 7	2446
	α Pegasi E.	66 4 17	2509	64 23 16	2529	62 42 43	2551	61 2 41	2576
	α Arietis E.	107 42 27	2122	105 52 1	2123	104 1 37	2124	102 11 15	2127
23	Spica W.	101 16 35	2067	103 8 25	2075	105 0 2	2085	106 51 24	2095
	Antares W.	55 22 8	2064	57 14 2	2072	59 5 44	2080	60 57 14	2089
	Fomalhaut E.	32 32 6	2734	30 56 11	2823	29 22 13	2927	27 50 29	3052
	α Pegasi E.	52 52 23	2749	51 16 48	2796	49 42 15	2848	48 8 49	2905
	α Arietis E.	93 0 57	2155	91 11 22	2163	89 21 59	2172	87 32 50	2182
24	Antares W.	70 11 2	2141	72 0 58	2154	73 50 35	2167	75 39 53	2180
	α Aquilæ W.	38 25 59	2901	39 20 20	2964	40 17 44	2758	41 17 55	2578
	Saturn W.	29 44 57	2132	31 35 7	2143	33 25 2	2153	35 14 41	2164
	α Arietis E.	78 31 11	2243	76 43 48	2258	74 56 46	2272	73 10 6	2288
	SUN E.	134 33 45	2417	132 50 35	2431	131 7 44	2444	129 25 12	2458
25	Antares W.	84 41 18	2250	86 28 31	2265	88 15 22	2281	90 1 50	2296
	α Aquilæ W.	46 52 30	2965	48 4 44	2984	49 18 20	2812	50 33 10	2748
	Saturn W.	44 18 28	2228	46 6 14	2242	47 53 39	2256	49 40 43	2271
	α Arietis E.	64 22 51	2377	62 38 43	2397	60 55 4	2417	59 11 53	2438
	SUN E.	120 57 41	2535	119 17 16	2550	117 37 12	2566	115 57 31	2583
26	Antares W.	98 48 29	2375	100 32 39	2391	102 16 26	2408	103 59 50	2424
	Saturn W.	58 30 33	2347	60 15 24	2362	61 59 53	2378	63 43 59	2394
	α Aquilæ W.	57 1 30	2534	58 21 17	2506	59 41 34	2492	61 2 18	2469
	Fomalhaut W.	21 41 2	2961	22 53 0	2772	24 8 31	2610	25 26 54	2481
	α Arietis E.	50 43 53	2557	49 3 59	2584	47 24 42	2612	45 46 3	2640
27	SUN E.	107 44 50	2668	106 7 27	2686	104 30 28	2702	102 53 51	2719
	Antares W.	112 31 2	2505	114 12 8	2521	115 52 52	2538	117 33 13	2553
	Saturn W.	72 18 56	2472	74 0 49	2477	75 42 20	2502	77 23 30	2517
	α Aquilæ W.	67 50 31	2404	69 12 43	2399	70 35 1	2396	71 57 22	2394
	Fomalhaut W.	32 27 28	3117	33 55 17	3080	35 23 51	3049	36 53 3	3025
28	α Arietis E.	37 43 26	2817	36 9 20	2861	34 36 11	2908	33 4 2	2960
	SUN E.	94 56 28	2805	93 22 7	2822	91 48 8	2838	90 14 30	2855
	Saturn W.	85 44 8	2591	87 23 15	2606	89 2 2	2620	90 40 30	2633
	α Aquilæ W.	78 48 57	2409	80 11 3	2415	81 33 2	2423	82 54 53	2431
	Fomalhaut W.	44 24 54	2961	45 55 56	2956	47 27 4	2953	48 58 16	2951
29	α Pegasi W.	32 44 38	4467	33 48 59	4323	34 55 30	4200	36 3 56	4065
	SUN E.	82 31 39	2836	81 0 6	2852	79 28 53	2867	77 57 59	2882
	Saturn W.	98 48 16	2700	100 24 56	2719	102 1 20	2725	103 37 27	2737
	α Aquilæ W.	89 41 25	2486	91 2 5	2499	92 22 30	2514	93 42 39	2528
	Fomalhaut W.	56 34 11	2961	58 5 13	2965	59 36 9	2969	61 7 0	2975
30	α Pegasi W.	42 7 56	3738	43 24 3	3692	44 40 59	3651	45 58 38	3615
	SUN E.	70 28 7	3055	68 59 2	3089	67 30 14	3062	66 1 42	3085
	Saturn W.	111 34 12	2793	113 8 49	2804	114 43 12	2815	116 17 21	2825
	Fomalhaut W.	68 39 27	3005	70 9 33	3012	71 39 31	3019	73 9 20	3026
	α Pegasi W.	52 35 13	2491	53 55 47	2475	55 16 39	2461	56 37 47	2449
31	SUN E.	58 42 57	3158	57 15 57	3168	55 49 10	3180	54 22 37	3198

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.		Midnight.	P. L. of Diff.	XV <sup>h</sup> .	P. L. of Diff.	XVIII <sup>h</sup> .	P. L. of Diff.	XXI <sup>h</sup> .	P. L. of Diff.
22	Spica	W.	93 47 18	2039	95 39 52	2044	97 32 17	2051	99 24 32	2059
	Antares	W.	47 53 1	2042	49 45 29	2047	51 37 50	2052	53 30 4	2058
	Fomalhaut	E.	39 10 38	2049	37 29 9	2037	35 48 47	2033	34 9 42	2058
	α Pegasi	E.	59 23 13	2004	57 44 23	2035	56 6 15	2069	54 28 54	2707
	α Arietis	E.	100 20 57	2131	98 30 45	2136	96 40 40	2141	94 50 44	2147
23	Spica	W.	108 42 31	2106	110 33 21	2117	112 23 54	2128	114 14 10	2142
	Antares	W.	62 48 30	2096	64 39 32	2109	66 30 18	2119	68 20 48	2130
	Fomalhaut	E.	26 21 20	2001	24 55 12	2033	23 32 36	2005	22 14 7	2082
	α Pegasi	E.	46 36 37	2069	45 5 45	2039	43 36 21	2117	42 8 32	2005
	α Arietis	E.	85 43 56	2193	83 55 18	2204	82 6 57	2216	80 18 54	2230
24	Antares	W.	77 28 51	2192	79 17 30	2207	81 5 47	2221	82 53 43	2235
	α Aquilæ	W.	42 20 39	2421	43 25 41	2424	44 32 48	2464	45 41 48	2459
	Saturn	W.	37 4 3	2175	38 53 8	2188	40 41 54	2200	42 30 21	2214
	α Arietis	E.	71 23 49	2204	69 37 56	2222	67 52 28	2239	66 7 26	2258
	SUN	E.	127 43 0	2473	126 1 9	2487	124 19 38	2503	122 38 29	2518
25	Antares	W.	91 47 56	2211	93 33 39	2227	95 18 59	2243	97 3 56	2259
	α Aquilæ	W.	51 49 6	2393	53 6 0	2405	54 23 46	2402	55 42 18	2365
	Saturn	W.	51 27 25	2286	53 13 45	2301	54 59 43	2316	56 45 19	2331
	α Arietis	E.	57 29 13	2400	55 47 4	2423	54 5 27	2507	52 24 23	2531
	SUN	E.	114 18 13	2600	112 39 18	2617	111 0 46	2633	109 22 36	2651
26	Antares	W.	105 42 50	2440	107 25 28	2457	109 7 42	2473	110 49 33	2489
	Saturn	W.	65 27 43	2409	67 11 5	2425	68 54 4	2441	70 36 41	2456
	α Aquilæ	W.	62 23 25	2445	63 44 51	2431	65 6 32	2420	66 28 26	2410
	Fomalhaut	W.	26 47 39	2375	28 10 24	2388	29 34 49	2390	31 0 35	2163
	α Arietis	E.	44 8 3	2672	42 30 46	2704	40 54 12	2739	39 18 24	2777
27	SUN	E.	101 17 37	2737	99 41 46	2754	98 6 18	2771	96 31 12	2788
	Antares	W.	119 13 12	2569	120 52 49	2585	122 32 4	2601	124 10 57	2617
	Saturn	W.	79 4 19	2533	80 44 47	2548	82 24 54	2562	84 4 41	2577
	α Aquilæ	W.	73 19 45	2394	74 42 8	2397	76 4 28	2400	77 26 45	2404
	Fomalhaut	W.	38 22 45	2005	39 52 52	2009	41 23 19	2077	42 54 1	2068
28	α Arietis	E.	31 32 59	2018	30 3 9	2084	28 34 40	2157	27 7 39	2239
	SUN	E.	88 41 14	2272	87 8 19	2288	85 35 45	2305	84 3 32	2320
	Saturn	W.	92 18 40	2647	93 56 31	2660	95 34 4	2674	97 11 19	2687
	α Aquilæ	W.	84 16 34	2440	85 38 5	2451	86 59 24	2462	88 20 31	2473
	Fomalhaut	W.	50 29 30	2251	52 0 44	2253	53 31 56	2255	55 3 5	2258
29	α Pegasi	W.	37 14 3	2003	38 25 40	2022	39 38 37	2033	40 52 45	2092
	SUN	E.	76 27 24	2297	74 57 8	2312	73 27 10	2326	71 57 30	2340
	Saturn	W.	105 13 18	2748	106 48 54	2760	108 24 15	2771	109 59 21	2782
	α Aquilæ	W.	95 2 32	2545	96 22 7	2560	97 41 25	2577	99 0 24	2595
	Fomalhaut	W.	62 37 44	2281	64 8 21	2286	65 38 51	2293	67 9 13	2299
30	α Pegasi	W.	47 16 56	2584	48 35 48	2555	49 55 11	2532	51 15 0	2510
	SUN	E.	64 33 26	2108	63 5 26	2120	61 37 41	2133	60 10 12	2145
	Saturn	W.	117 51 17	2835	119 25 0	2845	120 58 30	2854	122 31 48	2863
	Fomalhaut	W.	74 39 0	2033	76 8 32	2040	77 37 55	2047	79 7 9	2055
	α Pegasi	W.	57 59 8	2438	59 20 41	2429	60 42 25	2421	62 4 18	2415
31	SUN	E.	52 56 18	2303	51 30 12	2313	50 4 18	2324	48 38 37	2333

## AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S						Sidereal Time of the Semi-diameter passing the Meridian.	Equation of Time, to be added to Apparent Time.	Diff. for 1 hour.	
		Apparent Right Ascension.		Diff. for 1 hour.	Apparent Declination.		Diff. for 1 hour.				Semi-diameter.
		<sup>h</sup> <sup>m</sup> <sup>s</sup>			<sup>°</sup> <sup>'</sup> <sup>"</sup>						
Mon.	1	6 42 58.05	10.337	N. 23° 5' 19.9"	10.61	15' 46".12	68.77	3 34.64	+0.480		
Tues.	2	6 47 6.04	10.325	23 0 53.2	11.62	15 46.11	68.73	3 46.04	0.470		
Wed.	3	6 51 13.76	10.315	22 56 2.3	12.62	15 46.11	68.68	3 57.16	0.458		
Thur.	4	6 55 21.19	10.302	22 50 47.5	13.61	15 46.11	68.64	4 8.01	0.445		
Frid.	5	6 59 28.28	10.288	22 45 8.8	14.60	15 46.13	68.59	4 18.52	0.431		
Sat.	6	7 3 35.03	10.274	22 39 6.3	15.59	15 46.15	68.54	4 28.69	0.417		
Sun.	7	7 7 41.42	10.259	22 32 40.2	16.57	15 46.16	68.49	4 38.49	0.402		
Mon.	8	7 11 47.42	10.242	22 25 50.7	17.54	15 46.19	68.44	4 47.92	0.385		
Tues.	9	7 15 53.00	10.224	22 18 38.0	18.50	15 46.23	68.38	4 56.92	0.367		
Wed.	10	7 19 58.15	10.205	22 11 2.2	19.47	15 46.27	68.32	5 5.50	0.348		
Thur.	11	7 24 2.85	10.186	22 3 3.5	20.42	15 46.31	68.26	5 13.61	0.329		
Frid.	12	7 28 7.08	10.166	21 54 42.1	21.36	15 46.36	68.21	5 21.25	0.309		
Sat.	13	7 32 10.83	10.145	21 45 58.0	22.29	15 46.42	68.14	5 28.42	0.288		
Sun.	14	7 36 14.08	10.124	21 36 51.7	23.21	15 46.48	68.07	5 35.09	0.266		
Mon.	15	7 40 16.82	10.104	21 27 23.4	24.14	15 46.54	68.00	5 41.25	0.247		
Tues.	16	7 44 19.04	10.082	21 17 33.1	25.04	15 46.59	67.93	5 46.89	0.225		
Wed.	17	7 48 20.72	10.059	21 7 21.2	25.94	15 46.66	67.85	5 52.01	0.202		
Thur.	18	7 52 21.85	10.035	20 56 48.0	26.82	15 46.73	67.78	5 56.58	0.179		
Frid.	19	7 56 22.43	10.012	20 45 53.5	27.71	15 46.81	67.70	6 0.59	0.156		
Sat.	20	8 0 22.46	9.989	20 34 38.1	28.57	15 46.89	67.62	6 4.04	0.133		
Sun.	21	8 4 21.94	9.966	20 23 1.9	29.43	15 46.97	67.54	6 6.95	0.110		
Mon.	22	8 8 20.55	9.943	20 11 5.1	30.27	15 47.06	67.46	6 9.31	0.087		
Tues.	23	8 12 19.19	9.919	19 58 48.2	31.11	15 47.15	67.37	6 11.09	0.063		
Wed.	24	8 16 16.95	9.895	19 46 11.3	31.95	15 47.24	67.29	6 12.28	0.039		
Thur.	25	8 20 14.13	9.871	19 33 14.7	32.77	15 47.34	67.21	6 12.90	+0.015		
Frid.	26	8 24 10.74	9.847	19 19 58.6	33.57	15 47.44	67.13	6 12.97	-0.009		
Sat.	27	8 28 6.78	9.823	19 6 23.2	34.37	15 47.54	67.04	6 12.47	0.033		
Sun.	28	8 32 2.24	9.799	18 52 28.8	35.16	15 47.65	66.96	6 11.37	0.057		
Mon.	29	8 35 57.12	9.775	18 38 15.8	35.93	15 47.76	66.87	6 9.69	0.081		
Tues.	30	8 39 51.42	9.750	18 23 44.2	36.69	15 47.86	66.78	6 7.43	0.106		
Wed.	31	8 43 45.12	9.725	18 8 54.5	37.44	15 47.98	66.69	6 4.58	0.131		
Thur.	32	8 47 38.22	9.700	N. 17° 53' 46.9"	38.17	15 48.10	66.60	6 1.14	0.156		

NOTE.—Mean Time of the Semidiameter passing may be found by subtracting 0s.19 from the Sidereal Time.

## AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time, to be subtracted from Mean Time.	Diff. for 1 hour.	Sidereal Time or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.			
Mon.	1	<sup>h</sup> 6 <sup>m</sup> 42 <sup>s</sup> 57.43	10.336	N. 23° 5' 20.5"	10.61	<sup>m</sup> 3 <sup>s</sup> 34.61	0.480	<sup>h</sup> 6 <sup>m</sup> 39 <sup>s</sup> 22.82
Tues.	2	6 47 5.39	10.326	23 0 53.9	11.62	3 46.02	0.470	6 43 19.37
Wed.	3	6 51 13.08	10.314	22 56 3.1	12.62	3 57.15	0.458	6 47 15.93
Thur.	4	6 55 20.48	10.301	22 50 48.4	13.61	4 7.99	0.445	6 51 12.49
Frid.	5	6 59 27.54	10.287	22 45 9.8	14.60	4 18.49	0.431	6 55 9.05
Sat.	6	7 3 34.26	10.273	22 39 7.5	15.59	4 28.65	0.417	6 59 5.61
Sun.	7	7 7 40.62	10.258	22 32 41.5	16.57	4 38.45	0.402	7 3 2.17
Mon.	8	7 11 46.60	10.241	22 25 52.1	17.54	4 47.88	0.385	7 6 58.72
Tues.	9	7 15 52.16	10.223	22 18 39.5	18.50	4 56.88	0.367	7 10 55.28
Wed.	10	7 19 57.29	10.204	22 11 3.8	19.47	5 5.45	0.348	7 14 51.84
Thur.	11	7 24 1.97	10.185	22 3 5.2	20.42	5 13.57	0.329	7 18 48.40
Frid.	12	7 28 6.18	10.165	21 54 43.9	21.36	5 21.22	0.309	7 22 44.96
Sat.	13	7 32 9.91	10.144	21 46 0.0	22.29	5 28.39	0.288	7 26 41.52
Sun.	14	7 36 13.14	10.123	21 36 53.9	23.21	5 35.07	0.267	7 30 38.07
Mon.	15	7 40 15.86	10.103	21 27 25.7	24.14	5 41.23	0.247	7 34 34.63
Tues.	16	7 44 18.07	10.081	21 17 35.5	25.04	5 46.89	0.225	7 38 31.18
Wed.	17	7 48 19.24	10.058	21 7 23.7	25.94	5 52.00	0.202	7 42 27.74
Thur.	18	7 52 20.86	10.035	20 56 50.6	26.82	5 56.56	0.179	7 46 24.30
Frid.	19	7 56 21.43	10.012	20 45 56.2	27.71	6 0.57	0.156	7 50 20.86
Sat.	20	8 0 21.45	9.989	20 34 40.9	28.57	6 4.03	0.133	7 54 17.42
Sun.	21	8 4 20.92	9.966	20 23 4.9	29.43	6 6.95	0.110	7 58 13.97
Mon.	22	8 8 19.83	9.943	20 11 8.3	30.27	6 9.30	0.087	8 2 10.53
Tues.	23	8 12 18.16	9.919	19 58 51.5	31.11	6 11.08	0.063	8 6 7.08
Wed.	24	8 16 15.92	9.895	19 46 14.6	31.95	6 12.28	0.039	8 10 3.64
Thur.	25	8 20 13.10	9.871	19 33 18.1	32.77	6 12.90	+0.015	8 14 0.20
Frid.	26	8 24 9.72	9.847	19 20 2.1	33.57	6 12.95	-0.009	8 17 56.75
Sat.	27	8 28 5.76	9.823	19 6 26.8	34.37	6 12.45	0.033	8 21 53.31
Sun.	28	8 32 1.23	9.799	18 52 32.5	35.16	6 11.36	0.057	8 25 49.87
Mon.	29	8 35 56.12	9.775	18 38 19.5	35.93	6 9.70	0.081	8 29 46.42
Tues.	30	8 39 50.42	9.750	18 23 48.0	36.69	6 7.44	0.106	8 33 42.98
Wed.	31	8 43 44.13	9.725	18 8 58.3	37.44	6 4.59	0.131	8 37 39.54
Thur.	32	8 47 37.25	9.700	N. 17° 53' 50.8"	38.17	6 1.16	0.156	8 41 36.09

NOTE.—The Semidiameter for Mean Noon may be assumed the same as that for Apparent Noon.

Diff. for 1 hour  
+9<sup>s</sup>.8565

AT GREENWICH MEAN NOON.									
Day of the Month.	Day of the Year.	THE SUN'S					Logarithm of the Radius Vector of the Earth.	Diff. for 1 hour.	Mean Time of Sidereal Oh.
		True LONGITUDE.		Diff. for 1 hour.	LATITUDE.				
		$\lambda$	$\lambda'$						
1	183	99° 52' 31.9	52° 22.6	143.02	-0.34	0.0072287	+ 1.7	17 17 46.70	
2	184	100 49 44.6	49 35.1	143.03	0.21	.0072315	+ 0.7	17 13 50.79	
3	185	101 46 57.4	46 47.7	143.04	-0.07	.0072318	- 0.4	17 9 54.88	
4	186	102 44 10.5	44 0.6	143.05	+0.06	.0072295	1.5	17 5 58.97	
5	187	103 41 23.7	41 13.6	143.06	0.19	.0072245	2.6	17 2 3.05	
6	188	104 38 37.1	38 26.8	143.07	0.29	.0072170	3.7	16 58 7.13	
7	189	105 35 50.7	35 40.3	143.07	0.38	.0072069	4.8	16 54 11.22	
8	190	106 33 4.3	32 53.8	143.07	0.45	.0071942	5.9	16 50 15.31	
9	191	107 30 17.9	30 7.2	143.07	0.47	.0071788	6.9	16 46 19.40	
10	192	108 27 31.5	27 20.6	143.07	0.47	.0071609	7.9	16 42 23.48	
11	193	109 24 45.2	24 34.1	143.07	0.44	.0071407	8.8	16 38 27.57	
12	194	110 21 58.9	21 47.6	143.07	0.37	.0071183	9.7	16 34 31.66	
13	195	111 19 12.6	19 1.1	143.07	0.29	.0070938	10.6	16 30 35.75	
14	196	112 16 26.3	16 14.6	143.07	0.20	.0070673	11.4	16 26 39.83	
15	197	113 13 40.2	13 28.4	143.08	+0.08	.0070388	12.2	16 22 43.92	
16	198	114 10 54.3	10 42.3	143.09	-0.06	.0070086	12.9	16 18 48.01	
17	199	115 8 8.6	7 56.5	143.10	0.19	.0069768	13.6	16 14 52.10	
18	200	116 5 23.3	5 11.0	143.12	0.33	.0069436	14.2	16 10 56.19	
19	201	117 2 38.4	2 26.0	143.14	0.44	.0069090	14.7	16 7 0.28	
20	202	117 59 54.0	59 41.4	143.16	0.53	.0068730	15.3	16 3 4.37	
21	203	118 57 10.2	56 57.4	143.19	0.61	.0068356	15.9	15 59 8.46	
22	204	119 54 27.0	54 14.0	143.22	0.66	.0067968	16.5	15 55 12.55	
23	205	120 51 44.5	51 31.4	143.25	0.67	.0067566	17.1	15 51 16.64	
24	206	121 49 2.8	48 49.5	143.29	0.66	.0067151	17.7	15 47 20.73	
25	207	122 46 22.1	46 8.7	143.33	0.62	.0066721	18.3	15 43 24.82	
26	208	123 43 42.4	43 28.8	143.37	0.54	.0066274	19.0	15 39 28.90	
27	209	124 41 3.8	40 50.1	143.41	0.45	.0065809	19.7	15 35 32.99	
28	210	125 38 26.2	38 12.3	143.45	0.33	.0065327	20.5	15 31 37.08	
29	211	126 35 49.6	35 35.6	143.50	0.20	.0064826	21.3	15 27 41.17	
30	212	127 33 14.1	32 59.9	143.54	-0.06	.0064304	22.2	15 23 45.26	
31	213	128 30 39.8	30 25.5	143.59	+0.08	.0063760	23.1	15 19 49.35	
32	214	129 28 6.6	27 52.1	143.63	+0.21	0.0063193	-24.0	15 15 53.45	
NOTE: $\lambda$ corresponds to the true equinox of the date, $\lambda'$ to the mean equinox of January 0d.								Diff. for 1 hour -9 <sup>h</sup> .8296	

## GREENWICH MEAN TIME.

Day of the Month.	THE MOON'S									
	SEMI- DIAMETER.		HORIZONTAL PARALLAX.				MERIDIAN PASSAGE.		AGE.	
	Noon.	Midnight.	Noon.	Diff. for 1 hour.	Midnight.	Diff. for 1 hour.		Diff. for 1 hour.	Noon.	
1	15' 5.7	15' 1.8	55' 17.4	-1.25	55' 3.1	-1.13	<sup>h</sup> 21 <sup>m</sup> 24.0	<sup>m</sup> 1.98	<sup>d</sup> 25.4	
2	14 58.3	14 55.3	54 50.3	1.01	54 38.9	0.88	22 12.3	2.04	26.4	
3	14 52.6	14 50.2	54 29.0	0.77	54 20.4	0.66	23 2.0	2.09	27.4	
4	14 48.3	14 46.6	54 13.2	0.55	54 7.3	0.44	23 52.0	2.09	28.4	
5	14 45.4	14 44.5	54 2.7	0.33	53 59.3	0.23	<sup>d</sup> 0		29.4	
6	14 43.9	14 43.7	53 57.2	-0.11	53 56.5	-0.00	0 42.4	2.06	0.7	
7	14 43.9	14 44.4	53 57.2	+0.11	53 59.2	+0.23	1 31.2	1.99	1.7	
8	14 45.4	14 46.9	54 2.9	0.37	54 8.3	0.52	2 18.2	1.91	2.7	
9	14 48.9	14 51.4	54 15.5	0.68	54 24.6	0.84	3 3.2	1.84	3.7	
10	14 54.4	14 58.0	54 35.7	1.01	54 48.8	1.17	3 46.6	1.78	4.7	
11	15 2.1	15 6.7	55 3.9	1.34	55 21.1	1.51	4 29.0	1.76	5.7	
12	15 11.9	15 17.7	55 40.2	1.67	56 1.2	1.83	5 11.3	1.78	6.7	
13	15 23.9	15 30.6	56 24.2	1.98	56 48.8	2.12	5 54.6	1.85	7.7	
14	15 37.8	15 45.2	57 15.0	2.23	57 42.3	2.32	6 40.0	1.97	8.7	
15	15 52.9	16 0.6	58 10.5	2.36	58 38.9	2.37	7 29.1	2.14	9.7	
16	16 8.3	16 15.7	59 7.1	2.32	59 34.5	2.22	8 22.8	2.35	10.7	
17	16 22.8	16 29.2	60 0.3	2.06	60 23.8	1.85	9 21.9	2.57	11.7	
18	16 34.8	16 39.4	60 44.4	1.57	61 1.3	1.24	10 25.6	2.73	12.7	
19	16 42.8	16 45.0	61 14.0	0.87	61 22.0	+0.47	11 31.7	2.75	13.7	
20	16 45.8	16 45.3	61 25.1	+0.05	61 23.1	-0.37	12 37.0	2.65	14.7	
21	16 43.4	16 40.2	61 16.2	-0.78	61 4.5	1.07	13 38.7	2.47	15.7	
22	16 35.9	16 30.5	60 48.5	1.42	60 28.7	1.79	14 35.7	2.27	16.7	
23	16 24.2	16 17.2	60 5.7	2.03	59 40.3	2.20	15 28.0	2.11	17.7	
24	16 9.9	16 2.3	59 13.2	2.31	58 45.1	2.36	16 16.9	1.98	18.7	
25	15 54.5	15 46.8	58 16.6	2.37	57 48.3	2.33	17 3.6	1.92	19.7	
26	15 39.5	15 32.1	57 20.7	2.26	56 54.2	2.15	17 49.2	1.90	20.7	
27	15 25.3	15 18.9	56 29.2	2.02	56 5.9	1.87	18 35.0	1.92	21.7	
28	15 13.1	15 7.8	55 44.5	1.71	55 25.0	1.54	19 21.5	1.97	22.7	
29	15 3.0	14 58.8	55 7.4	1.38	54 51.9	1.21	20 9.5	2.02	23.7	
30	14 55.1	14 52.0	54 38.5	1.04	54 27.0	0.87	20 58.7	2.07	24.7	
31	14 49.3	14 47.4	54 17.5	0.71	54 9.9	0.55	21 48.8	2.09	25.7	
32	14 45.8	14 44.7	54 4.2	-0.41	54 0.1	-0.25	22 38.9	2.07	26.7	



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
MONDAY 1.					WEDNESDAY 3.				
0	3 22 58.07	2.0371	N.16° 44' 1.4"	10.337	0	5 3 8.53	2.1456	N.23° 13' 22.7"	5.651
1	3 24 59.76	2.0385	16 54 18.4	10.343	1	5 5 17.33	2.1473	23 18 58.4	5.539
2	3 27 1.60	2.0318	17 4 30.6	10.163	2	5 7 26.26	2.1500	23 24 27.4	5.426
3	3 29 3.58	2.0342	17 14 38.0	10.080	3	5 9 35.33	2.1532	23 29 49.6	5.314
4	3 31 5.70	2.0365	17 24 40.3	9.995	4	5 11 44.52	2.1541	23 35 5.0	5.200
5	3 33 7.96	2.0389	17 34 37.5	9.910	5	5 13 53.82	2.1560	23 40 13.6	5.086
6	3 35 10.37	2.0414	17 44 29.6	9.826	6	5 16 3.24	2.1580	23 45 15.4	4.972
7	3 37 12.93	2.0439	17 54 16.6	9.740	7	5 18 12.78	2.1599	23 50 10.3	4.857
8	3 39 15.63	2.0463	18 3 58.4	9.653	8	5 20 22.43	2.1617	23 54 58.3	4.742
9	3 41 18.48	2.0488	18 13 35.0	9.566	9	5 22 32.19	2.1636	23 59 39.4	4.627
10	3 43 21.48	2.0512	18 23 6.3	9.478	10	5 24 42.06	2.1654	24 4 13.6	4.511
11	3 45 24.63	2.0537	18 32 32.3	9.389	11	5 26 52.03	2.1671	24 8 40.8	4.394
12	3 47 27.93	2.0562	18 41 53.0	9.300	12	5 29 2.11	2.1689	24 13 0.9	4.276
13	3 49 31.38	2.0588	18 51 8.3	9.209	13	5 31 12.29	2.1704	24 17 14.0	4.160
14	3 51 34.99	2.0614	19 0 18.1	9.118	14	5 33 22.56	2.1721	24 21 20.1	4.043
15	3 53 38.75	2.0639	19 9 22.5	9.026	15	5 35 32.93	2.1737	24 25 19.2	3.926
16	3 55 42.66	2.0665	19 18 21.3	8.934	16	5 37 43.39	2.1751	24 29 11.2	3.807
17	3 57 46.73	2.0691	19 27 14.6	8.841	17	5 39 53.94	2.1765	24 32 56.1	3.689
18	3 59 50.95	2.0716	19 36 2.3	8.748	18	5 42 4.57	2.1778	24 36 33.9	3.571
19	4 1 55.32	2.0742	19 44 44.4	8.654	19	5 44 15.28	2.1792	24 40 4.6	3.452
20	4 3 59.85	2.0768	19 53 20.8	8.559	20	5 46 26.08	2.1807	24 43 28.1	3.332
21	4 6 4.55	2.0797	20 1 51.5	8.464	21	5 48 36.96	2.1820	24 46 44.4	3.212
22	4 8 9.41	2.0822	20 10 16.5	8.368	22	5 50 47.91	2.1830	24 49 53.3	3.092
23	4 10 14.41	2.0846	N.20 18 35.7	8.271	23	5 52 58.92	2.1839	N.24 52 55.4	2.972
TUESDAY 2.					THURSDAY 4.				
0	4 12 19.55	2.0870	N.20 26 49.2	8.173	0	5 55 9.98	2.1848	N.24 55 50.2	2.852
1	4 14 24.85	2.0897	20 34 56.6	8.074	1	5 57 21.10	2.1860	24 58 37.7	2.731
2	4 16 30.32	2.0925	20 42 58.1	7.976	2	5 59 32.30	2.1872	25 1 17.9	2.610
3	4 18 35.95	2.0951	20 50 53.8	7.877	3	6 1 43.57	2.1889	25 3 50.9	2.489
4	4 20 41.73	2.0976	20 58 43.5	7.777	4	6 3 54.89	2.1889	25 6 16.6	2.367
5	4 22 47.66	2.1001	21 6 27.1	7.675	5	6 6 6.24	2.1894	25 8 35.0	2.247
6	4 24 53.74	2.1026	21 14 4.5	7.573	6	6 8 17.62	2.1900	25 10 46.2	2.126
7	4 26 59.97	2.1052	21 21 35.8	7.472	7	6 10 29.04	2.1908	25 12 50.1	2.003
8	4 29 6.36	2.1079	21 29 1.1	7.372	8	6 12 40.51	2.1915	25 14 46.6	1.881
9	4 31 12.91	2.1104	21 36 20.3	7.268	9	6 14 52.03	2.1923	25 16 35.8	1.759
10	4 33 19.61	2.1129	21 43 33.3	7.164	10	6 17 3.58	2.1926	25 18 17.7	1.636
11	4 35 26.46	2.1153	21 50 40.0	7.058	11	6 19 15.14	2.1927	25 19 52.2	1.514
12	4 37 33.44	2.1175	21 57 40.3	6.952	12	6 21 26.70	2.1929	25 21 19.4	1.392
13	4 39 40.56	2.1201	22 4 34.3	6.847	13	6 23 38.28	2.1933	25 22 39.3	1.270
14	4 41 47.85	2.1229	22 11 22.0	6.742	14	6 25 49.89	2.1938	25 23 51.8	1.148
15	4 43 55.30	2.1253	22 18 3.4	6.636	15	6 28 1.53	2.1939	25 24 57.0	1.025
16	4 46 2.89	2.1276	22 24 38.3	6.528	16	6 30 13.16	2.1939	25 25 54.8	0.902
17	4 48 10.61	2.1298	22 31 6.8	6.421	17	6 32 24.79	2.1936	25 26 45.3	0.781
18	4 50 18.47	2.1321	22 37 28.8	6.312	18	6 34 36.41	2.1937	25 27 28.5	0.658
19	4 52 26.45	2.1343	22 43 44.3	6.203	19	6 36 48.03	2.1936	25 28 4.3	0.535
20	4 54 34.59	2.1367	22 49 53.2	6.093	20	6 38 59.64	2.1935	25 28 32.7	0.412
21	4 56 42.89	2.1391	22 55 55.5	5.983	21	6 41 11.25	2.1934	25 28 53.7	0.288
22	4 58 51.32	2.1414	23 1 51.2	5.873	22	6 43 22.84	2.1929	25 29 7.3	0.166
23	5 0 59.86	2.1434	23 7 40.3	5.762	23	6 45 34.40	2.1924	25 29 13.6	+0.043
24	5 3 8.53	2.1456	N.23 13 22.7	5.651	24	6 47 45.93	2.1920	N.25 29 12.5	-0.079

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
FRIDAY 5.					SUNDAY 7.				
0	6 47 45.93	2.1990	N.25° 29' 12.5"	-0.079	0	8 31 19.54	2.1033	N.23° 8' 44.6"	5.635
1	6 49 57.43	2.1914	25 29 4.1	0.909	1	8 33 25.65	2.1005	23 3 3.4	5.739
2	6 52 8.90	2.1910	25 28 48.4	0.393	2	8 35 31.58	2.0975	22 57 16.0	5.842
3	6 54 20.35	2.1905	25 28 25.4	0.444	3	8 37 37.34	2.0945	22 51 22.4	5.945
4	6 56 31.76	2.1896	25 27 55.1	0.567	4	8 39 42.92	2.0915	22 45 22.6	6.049
5	6 58 43.11	2.1887	25 27 17.4	0.689	5	8 41 48.32	2.0884	22 39 16.6	6.151
6	7 0 54.41	2.1879	25 26 32.4	0.811	6	8 43 53.53	2.0853	22 33 4.5	6.253
7	7 3 5.66	2.1870	25 25 40.1	0.933	7	8 45 58.56	2.0824	22 26 46.3	6.353
8	7 5 16.86	2.1861	25 24 40.5	1.053	8	8 48 3.41	2.0793	22 20 22.1	6.453
9	7 7 28.00	2.1851	25 23 33.7	1.174	9	8 50 8.08	2.0763	22 13 51.9	6.553
10	7 9 39.08	2.1840	25 22 19.6	1.296	10	8 52 12.57	2.0733	22 7 15.7	6.653
11	7 11 50.09	2.1829	25 20 58.2	1.417	11	8 54 16.87	2.0700	22 0 33.6	6.752
12	7 14 1.02	2.1815	25 19 29.6	1.537	12	8 56 20.97	2.0668	21 53 45.5	6.851
13	7 16 11.87	2.1803	25 17 53.8	1.658	13	8 58 24.88	2.0637	21 46 51.5	6.948
14	7 18 22.65	2.1799	25 16 10.7	1.778	14	9 0 28.61	2.0607	21 39 51.8	7.043
15	7 20 33.37	2.1790	25 14 20.4	1.898	15	9 2 32.17	2.0578	21 32 46.4	7.138
16	7 22 44.01	2.1784	25 12 22.9	2.018	16	9 4 35.54	2.0544	21 25 35.3	7.234
17	7 24 54.54	2.1746	25 10 18.3	2.136	17	9 6 38.70	2.0510	21 18 18.4	7.330
18	7 27 4.95	2.1737	25 8 6.6	2.254	18	9 8 41.66	2.0478	21 10 55.7	7.425
19	7 29 15.26	2.1713	25 5 47.8	2.373	19	9 10 44.43	2.0447	21 3 27.4	7.518
20	7 31 25.50	2.1700	25 3 21.8	2.493	20	9 12 47.02	2.0418	20 55 53.6	7.608
21	7 33 35.66	2.1684	25 0 48.7	2.611	21	9 14 49.44	2.0387	20 48 14.4	7.699
22	7 35 45.71	2.1664	24 58 8.5	2.729	22	9 16 51.67	2.0364	20 40 29.7	7.799
23	7 37 55.63	2.1642	N.24 55 21.3	2.845	23	9 18 53.69	2.0331	N.20 32 39.4	7.884
SATURDAY 6.					MONDAY 8.				
0	7 40 5.42	2.1621	N.24 52 27.1	2.962	0	9 20 55.51	2.0287	N.20 24 43.6	7.975
1	7 42 15.09	2.1600	24 49 25.9	3.079	1	9 22 57.14	2.0257	20 16 42.5	8.064
2	7 44 24.66	2.1580	24 46 17.7	3.195	2	9 24 58.59	2.0228	20 8 36.1	8.151
3	7 46 34.13	2.1562	24 43 2.5	3.311	3	9 26 59.87	2.0198	20 0 24.4	8.239
4	7 48 43.47	2.1542	24 39 40.4	3.426	4	9 29 0.96	2.0164	19 52 7.5	8.325
5	7 50 52.66	2.1520	24 36 11.4	3.541	5	9 31 1.84	2.0130	19 43 45.4	8.413
6	7 53 1.71	2.1498	24 32 35.5	3.656	6	9 33 2.52	2.0098	19 35 18.0	8.500
7	7 55 10.63	2.1476	24 28 52.7	3.770	7	9 35 3.02	2.0069	19 26 45.5	8.584
8	7 57 19.42	2.1455	24 25 3.1	3.884	8	9 37 3.34	2.0038	19 18 8.0	8.668
9	7 59 28.09	2.1434	24 21 6.8	3.996	9	9 39 3.48	2.0008	19 9 25.4	8.752
10	8 1 36.62	2.1408	24 17 3.7	4.109	10	9 41 3.44	1.9977	19 0 37.8	8.834
11	8 3 44.99	2.1381	24 12 53.8	4.223	11	9 43 3.20	1.9944	18 51 45.3	8.918
12	8 5 53.20	2.1355	24 8 37.1	4.334	12	9 45 2.77	1.9913	18 42 47.8	9.000
13	8 8 1.25	2.1331	24 4 13.7	4.445	13	9 47 2.16	1.9884	18 33 45.4	9.080
14	8 10 9.17	2.1309	23 59 43.8	4.555	14	9 49 1.38	1.9855	18 24 38.2	9.159
15	8 12 16.95	2.1283	23 55 7.2	4.665	15	9 51 0.42	1.9825	18 15 26.3	9.238
16	8 14 24.57	2.1256	23 50 24.0	4.775	16	9 52 59.28	1.9794	18 6 9.7	9.317
17	8 16 32.02	2.1228	23 45 34.2	4.885	17	9 54 57.95	1.9765	17 56 48.3	9.397
18	8 18 39.30	2.1200	23 40 37.9	4.994	18	9 56 56.45	1.9736	17 47 22.1	9.475
19	8 20 46.42	2.1174	23 35 35.1	5.101	19	9 58 54.78	1.9707	17 37 51.3	9.551
20	8 22 53.38	2.1146	23 30 25.8	5.209	20	10 0 52.93	1.9677	17 28 16.0	9.626
21	8 25 0.18	2.1119	23 25 10.1	5.315	21	10 2 50.90	1.9647	17 18 36.2	9.701
22	8 27 6.81	2.1090	23 19 48.0	5.422	22	10 4 48.70	1.9619	17 8 51.9	9.776
23	8 29 13.26	2.1061	23 14 19.5	5.529	23	10 6 46.33	1.9591	16 59 3.1	9.850
24	8 31 19.54	2.1033	N.23 8 44.6	5.635	24	10 8 43.80	1.9564	N.16 49 9.9	9.924

## GREENWICH MEAN TIME

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
TUESDAY 9.					THURSDAY 11.				
0	10 <sup>h</sup> 8 <sup>m</sup> 43.80	1.9564	N. 16° 49' 9.9"	9.994	0	11 <sup>h</sup> 40 <sup>m</sup> 10.38	1.8736	N. 7° 41' 39.8"	12.687
1	10 10 41.10	1.9536	16 39 12.3	9.996	1	11 42 2.72	1.8791	7 29 1.0	12.686
2	10 12 38.23	1.9508	16 29 10.4	10.068	2	11 43 55.02	1.8713	7 16 19.9	12.704
3	10 14 35.20	1.9469	16 19 4.2	10.138	3	11 45 47.27	1.8708	7 3 36.5	12.743
4	10 16 32.01	1.9455	16 8 53.8	10.308	4	11 47 39.51	1.8707	6 50 50.8	12.780
5	10 18 28.66	1.9429	15 58 39.2	10.379	5	11 49 31.75	1.8708	6 38 2.9	12.817
6	10 20 25.16	1.9404	15 48 20.3	10.349	6	11 51 24.00	1.8706	6 25 12.8	12.854
7	10 22 21.51	1.9378	15 37 57.3	10.417	7	11 53 16.24	1.8706	6 12 20.5	12.890
8	10 24 17.70	1.9351	15 27 30.3	10.484	8	11 55 8.47	1.8704	5 59 26.1	12.924
9	10 26 13.73	1.9326	15 16 59.3	10.550	9	11 57 0.69	1.8704	5 46 29.7	12.958
10	10 28 9.61	1.9303	15 6 24.3	10.617	10	11 58 52.92	1.8707	5 33 31.2	12.991
11	10 30 5.36	1.9281	14 55 45.3	10.684	11	12 0 45.17	1.8710	5 20 30.8	13.034
12	10 32 0.98	1.9258	14 45 2.3	10.749	12	12 2 37.44	1.8714	5 7 28.4	13.056
13	10 33 56.46	1.9235	14 34 15.5	10.812	13	12 4 29.73	1.8717	4 54 24.1	13.087
14	10 35 51.79	1.9209	14 23 24.9	10.875	14	12 6 22.04	1.8720	4 41 18.0	13.118
15	10 37 46.96	1.9185	14 12 30.5	10.939	15	12 8 14.36	1.8723	4 28 10.0	13.148
16	10 39 42.00	1.9163	14 1 32.3	11.001	16	12 10 6.71	1.8729	4 15 0.2	13.177
17	10 41 36.92	1.9144	13 50 30.4	11.063	17	12 11 59.11	1.8739	4 1 48.8	13.204
18	10 43 31.73	1.9125	13 39 24.8	11.123	18	12 13 51.57	1.8747	3 48 35.7	13.233
19	10 45 26.42	1.9103	13 28 15.6	11.183	19	12 15 44.07	1.8753	3 35 20.9	13.260
20	10 47 20.97	1.9079	13 17 2.9	11.241	20	12 17 36.60	1.8758	3 22 4.5	13.288
21	10 49 15.37	1.9057	13 5 46.7	11.299	21	12 19 29.17	1.8767	3 8 46.6	13.310
22	10 51 9.65	1.9040	12 54 27.0	11.358	22	12 21 21.80	1.8778	2 55 27.2	13.336
23	10 53 3.85	1.9028	N. 12° 43' 3.8"	11.415	23	12 23 14.51	1.8791	N. 2° 42' 6.3"	13.360
WEDNESDAY 10.					FRIDAY 12.				
0	10 54 57.96	1.9009	N. 12° 31' 37.2"	11.479	0	12 25 7.29	1.8803	N. 2° 28' 44.0"	13.384
1	10 56 51.96	1.8987	12 20 7.2	11.538	1	12 27 0.14	1.8814	2 15 20.3	13.406
2	10 58 45.83	1.8967	12 8 33.9	11.583	2	12 28 53.06	1.8826	2 1 55.3	13.428
3	11 0 39.56	1.8947	11 56 57.3	11.628	3	12 30 46.05	1.8838	1 48 29.0	13.449
4	11 2 33.19	1.8934	11 45 17.4	11.669	4	12 32 39.12	1.8853	1 35 1.4	13.469
5	11 4 26.76	1.8920	11 33 34.3	11.744	5	12 34 32.29	1.8869	1 21 32.7	13.488
6	11 6 20.26	1.8909	11 21 48.1	11.797	6	12 36 25.55	1.8885	1 8 2.8	13.508
7	11 8 13.67	1.8891	11 9 58.7	11.849	7	12 38 18.91	1.8909	0 54 31.8	13.525
8	11 10 6.96	1.8872	10 58 6.2	11.900	8	12 40 12.37	1.8919	0 40 59.8	13.543
9	11 12 0.14	1.8856	10 46 10.7	11.950	9	12 42 5.93	1.8936	0 27 26.7	13.560
10	11 13 53.24	1.8845	10 34 12.2	12.000	10	12 43 59.60	1.8955	0 13 52.6	13.575
11	11 15 46.29	1.8837	10 22 10.7	12.049	11	12 45 53.39	1.8976	N. 0° 0' 17.7"	13.590
12	11 17 39.29	1.8828	10 10 6.3	12.098	12	12 47 47.31	1.8998	S. 0° 13' 18.1"	13.604
13	11 19 32.22	1.8813	9 57 59.0	12.145	13	12 49 41.36	1.9018	0 26 54.7	13.617
14	11 21 25.05	1.8797	9 45 48.9	12.192	14	12 51 35.53	1.9038	0 40 32.1	13.630
15	11 23 17.79	1.8785	9 33 35.9	12.240	15	12 53 29.82	1.9060	0 54 10.3	13.643
16	11 25 10.47	1.8777	9 21 20.1	12.285	16	12 55 24.25	1.9084	1 7 49.2	13.653
17	11 27 3.12	1.8779	9 9 1.7	12.330	17	12 57 18.83	1.9110	1 21 28.6	13.661
18	11 28 55.74	1.8766	8 56 40.6	12.375	18	12 59 13.57	1.9137	1 35 8.5	13.670
19	11 30 48.31	1.8756	8 44 16.8	12.419	19	13 1 8.47	1.9162	1 48 49.0	13.679
20	11 32 40.81	1.8745	8 31 50.4	12.461	20	13 3 3.52	1.9187	2 2 30.0	13.687
21	11 34 33.24	1.8736	8 19 21.5	12.503	21	13 4 58.71	1.9214	2 16 11.4	13.694
22	11 36 25.63	1.8731	8 6 50.1	12.544	22	13 6 54.07	1.9243	2 29 53.2	13.700
23	11 38 18.01	1.8739	7 54 16.2	12.586	23	13 8 49.62	1.9274	2 43 35.3	13.704
24	11 40 10.38	1.8796	N. 7° 41' 39.8"	12.637	24	13 10 45.36	1.9305	S. 2° 57' 17.6"	13.707

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SATURDAY 13.					MONDAY 15.				
0	13 10 45.36	1.9305	S. 2 57 17.6	13.707	0	14 48 26.42	2.1714	S. 13 40 17.9	12.631
1	13 12 41.28	1.9335	3 11 0.1	13.710	1	14 50 36.91	2.1783	13 52 54.2	12.578
2	13 14 37.38	1.9365	3 24 42.8	13.713	2	14 52 47.82	2.1854	14 5 27.3	12.524
3	13 16 33.66	1.9396	3 38 25.6	13.713	3	14 54 59.16	2.1926	14 17 57.1	12.467
4	13 18 30.14	1.9431	3 52 8.4	13.713	4	14 57 10.93	2.1997	14 30 23.4	12.408
5	13 20 26.83	1.9466	4 5 51.2	13.713	5	14 59 23.12	2.2069	14 42 46.1	12.347
6	13 22 23.73	1.9501	4 19 34.0	13.712	6	15 1 35.75	2.2141	14 55 5.3	12.285
7	13 24 20.84	1.9537	4 33 16.7	13.709	7	15 3 48.82	2.2216	15 7 20.3	12.221
8	13 26 18.17	1.9573	4 46 59.1	13.705	8	15 6 2.34	2.2290	15 19 31.7	12.157
9	13 28 15.71	1.9609	5 0 41.2	13.700	9	15 8 16.30	2.2364	15 31 39.2	12.091
10	13 30 13.48	1.9646	5 14 23.1	13.695	10	15 10 30.71	2.2440	15 43 42.6	12.022
11	13 32 11.49	1.9689	5 28 4.6	13.689	11	15 12 45.58	2.2516	15 55 41.8	11.952
12	13 34 9.73	1.9727	5 41 45.8	13.682	12	15 15 0.90	2.2591	16 7 36.9	11.882
13	13 36 8.21	1.9767	5 55 26.5	13.672	13	15 17 16.68	2.2670	16 19 27.7	11.808
14	13 38 6.94	1.9810	6 9 6.6	13.662	14	15 19 32.93	2.2749	16 31 13.9	11.731
15	13 40 5.93	1.9853	6 22 46.0	13.651	15	15 21 49.66	2.2828	16 42 55.4	11.653
16	13 42 5.18	1.9895	6 36 24.7	13.640	16	15 24 6.86	2.2905	16 54 32.3	11.575
17	13 44 4.68	1.9938	6 50 2.8	13.629	17	15 26 24.52	2.2983	17 6 4.4	11.496
18	13 46 4.43	1.9981	7 3 40.2	13.615	18	15 28 42.65	2.3062	17 17 31.8	11.415
19	13 48 4.45	2.0028	7 17 16.7	13.600	19	15 31 1.26	2.3143	17 28 54.2	11.330
20	13 50 4.77	2.0078	7 30 52.2	13.589	20	15 33 20.37	2.3226	17 40 11.4	11.242
21	13 52 5.38	2.0125	7 44 26.6	13.564	21	15 35 39.97	2.3308	17 51 23.3	11.154
22	13 54 6.28	2.0174	7 57 59.9	13.546	22	15 38 0.07	2.3389	18 2 29.9	11.066
23	13 56 7.46	2.0221	S. 8 11 32.2	13.530	23	15 40 20.64	2.3467	S. 18 13 31.2	10.977
SUNDAY 14.					TUESDAY 16.				
0	13 58 8.93	2.0270	S. 8 25 3.5	13.511	0	15 42 41.67	2.3546	S. 18 24 27.1	10.885
1	14 0 10.70	2.0322	8 38 33.5	13.487	1	15 45 3.19	2.3630	18 35 17.4	10.789
2	14 2 12.79	2.0375	8 52 2.0	13.462	2	15 47 25.24	2.3719	18 46 1.8	10.690
3	14 4 15.20	2.0429	9 5 29.0	13.437	3	15 49 47.81	2.3804	18 56 40.2	10.591
4	14 6 17.93	2.0481	9 18 54.5	13.413	4	15 52 10.88	2.3884	19 7 12.7	10.492
5	14 8 20.97	2.0533	9 32 18.6	13.388	5	15 54 34.42	2.3962	19 17 39.2	10.390
6	14 10 24.33	2.0589	9 45 41.2	13.362	6	15 56 58.42	2.4042	19 27 59.6	10.287
7	14 12 28.04	2.0645	9 59 2.0	13.332	7	15 59 22.92	2.4128	19 38 13.7	10.180
8	14 14 32.08	2.0701	10 12 20.9	13.300	8	16 1 47.96	2.4219	19 48 21.2	10.069
9	14 16 36.45	2.0759	10 25 38.0	13.269	9	16 4 13.54	2.4305	19 58 22.0	9.959
10	14 18 41.17	2.0817	10 38 53.2	13.236	10	16 6 39.62	2.4385	20 8 16.3	9.849
11	14 20 46.25	2.0876	10 52 6.4	13.202	11	16 9 6.16	2.4463	20 18 3.9	9.735
12	14 22 51.69	2.0937	11 5 17.5	13.166	12	16 11 33.17	2.4543	20 27 44.6	9.620
13	14 24 57.49	2.0997	11 18 26.4	13.130	13	16 14 0.68	2.4630	20 37 18.3	9.502
14	14 27 3.65	2.1058	11 31 33.1	13.092	14	16 16 28.73	2.4720	20 46 44.8	9.389
15	14 29 10.18	2.1120	11 44 37.5	13.053	15	16 18 57.31	2.4805	20 56 4.1	9.260
16	14 31 17.09	2.1184	11 57 39.4	13.011	16	16 21 26.39	2.4895	21 5 16.0	9.135
17	14 33 24.38	2.1247	12 10 38.8	12.969	17	16 23 55.93	2.4982	21 14 20.4	9.011
18	14 35 32.05	2.1311	12 23 35.7	12.925	18	16 26 25.93	2.5049	21 23 17.4	8.886
19	14 37 40.11	2.1376	12 36 29.9	12.880	19	16 28 56.43	2.5127	21 32 6.7	8.755
20	14 39 48.57	2.1443	12 49 21.3	12.835	20	16 31 27.46	2.5215	21 40 48.0	8.622
21	14 41 57.42	2.1510	13 2 10.0	12.787	21	16 33 59.01	2.5299	21 49 21.4	8.490
22	14 44 6.67	2.1577	13 14 55.8	12.736	22	16 36 31.05	2.5377	21 57 46.8	8.355
23	14 46 16.34	2.1645	13 27 38.4	12.684	23	16 39 3.54	2.5453	22 6 4.0	8.217
24	14 48 26.42	2.1714	S. 13 40 17.9	12.631	24	16 41 36.48	2.5530	S. 22 14 12.9	8.079

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
WEDNESDAY 17.					FRIDAY 19.				
0	16 41 36.48	2.5530	S. 22° 14' 12.9"	8.079	0	18 51 33.33	2.8041	S. 25° 30' 1.3"	0.483
1	16 44 9.90	2.5612	22 22 13.4	7.937	1	18 54 21.61	2.8053	25 29 29.9	0.683
2	16 46 43.83	2.5699	22 30 5.4	7.795	2	18 57 9.96	2.8063	25 28 46.5	0.683
3	16 49 18.28	2.5781	22 37 48.9	7.652	3	18 59 58.37	2.8071	25 27 51.1	1.094
4	16 51 53.20	2.5855	22 45 23.7	7.505	4	19 2 46.81	2.8073	25 26 43.6	1.296
5	16 54 28.54	2.5926	22 52 49.5	7.355	5	19 5 35.24	2.8071	25 25 24.0	1.497
6	16 57 4.31	2.6000	23 0 6.3	7.205	6	19 8 23.66	2.8071	25 23 52.4	1.697
7	16 59 40.54	2.6079	23 7 14.1	7.053	7	19 11 12.08	2.8068	25 22 8.8	1.897
8	17 2 17.26	2.6160	23 14 12.7	6.900	8	19 14 0.47	2.8064	25 20 13.1	2.099
9	17 4 54.46	2.6238	23 21 2.1	6.745	9	19 16 48.85	2.8059	25 18 5.3	2.230
10	17 7 32.10	2.6308	23 27 42.1	6.587	10	19 19 37.18	2.8048	25 15 45.5	2.498
11	17 10 10.15	2.6375	23 34 12.5	6.427	11	19 22 25.43	2.8035	25 13 13.8	2.628
12	17 12 48.60	2.6444	23 40 33.3	6.266	12	19 25 13.60	2.8022	25 10 30.2	2.628
13	17 15 27.48	2.6517	23 46 44.4	6.103	13	19 28 1.69	2.8007	25 7 34.7	3.025
14	17 18 6.81	2.6591	23 52 45.7	5.940	14	19 30 49.69	2.7993	25 4 27.2	3.225
15	17 20 46.58	2.6662	23 58 37.2	5.775	15	19 33 37.60	2.7973	25 1 7.7	3.424
16	17 23 26.75	2.6726	24 4 18.7	5.606	16	19 36 25.39	2.7953	24 57 36.4	3.620
17	17 26 7.29	2.6788	24 9 49.9	5.435	17	19 39 13.03	2.7928	24 53 53.4	3.813
18	17 28 48.21	2.6852	24 15 10.9	5.265	18	19 42 0.52	2.7902	24 49 58.6	4.008
19	17 31 29.52	2.6918	24 20 21.7	5.092	19	19 44 47.85	2.7875	24 45 52.1	4.205
20	17 34 11.22	2.6982	24 25 22.0	4.918	20	19 47 35.02	2.7849	24 41 34.0	4.400
21	17 36 53.30	2.7043	24 30 11.9	4.743	21	19 50 22.04	2.7821	24 37 4.2	4.594
22	17 39 35.74	2.7101	24 34 51.2	4.566	22	19 53 8.87	2.7787	24 32 22.8	4.785
23	17 42 18.52	2.7158	S. 24° 39' 19.8"	4.387	23	19 55 55.48	2.7749	S. 24° 27' 30.0"	4.974
THURSDAY 18.					SATURDAY 20.				
0	17 45 1.64	2.7214	S. 24° 43' 37.6"	4.207	0	19 58 41.86	2.7712	S. 24° 22' 25.9"	5.164
1	17 47 45.09	2.7269	24 47 44.6	4.096	1	20 1 28.02	2.7675	24 17 10.3	5.354
2	17 50 28.87	2.7325	24 51 40.7	3.844	2	20 4 13.96	2.7637	24 11 43.4	5.543
3	17 53 12.99	2.7379	24 55 25.9	3.660	3	20 6 59.67	2.7597	24 6 5.2	5.730
4	17 55 57.42	2.7428	24 59 0.0	3.475	4	20 9 45.13	2.7554	24 0 15.8	5.915
5	17 58 42.12	2.7472	25 2 22.9	3.287	5	20 12 30.31	2.7507	23 54 15.4	6.099
6	18 1 27.08	2.7517	25 5 34.5	3.100	6	20 15 15.22	2.7462	23 48 4.0	6.281
7	18 4 12.32	2.7564	25 8 31.9	2.912	7	20 17 59.85	2.7414	23 41 41.6	6.462
8	18 6 57.85	2.7611	25 11 23.9	2.722	8	20 20 44.19	2.7366	23 35 8.5	6.642
9	18 9 43.66	2.7655	25 14 1.6	2.532	9	20 23 28.24	2.7316	23 28 24.6	6.821
10	18 12 29.71	2.7693	25 16 27.8	2.340	10	20 26 11.98	2.7263	23 21 30.0	6.997
11	18 15 15.97	2.7727	25 18 42.4	2.145	11	20 28 55.40	2.7209	23 14 24.9	7.172
12	18 18 2.43	2.7761	25 20 45.3	1.951	12	20 31 38.49	2.7154	23 7 9.4	7.345
13	18 20 49.10	2.7797	25 22 36.6	1.758	13	20 34 21.25	2.7097	22 59 43.5	7.518
14	18 23 35.99	2.7832	25 24 16.3	1.564	14	20 37 3.66	2.7040	22 52 7.3	7.688
15	18 26 23.09	2.7861	25 25 44.3	1.368	15	20 39 45.73	2.6983	22 44 20.9	7.858
16	18 29 10.37	2.7892	25 27 0.5	1.171	16	20 42 27.45	2.6923	22 36 24.4	8.025
17	18 31 57.80	2.7920	25 28 4.8	0.973	17	20 45 8.80	2.6861	22 28 18.0	8.189
18	18 34 45.36	2.7944	25 28 57.2	0.774	18	20 47 49.79	2.6801	22 20 1.8	8.352
19	18 37 33.05	2.7966	25 29 37.7	0.576	19	20 50 30.41	2.6738	22 11 35.8	8.514
20	18 40 20.89	2.7987	25 30 6.4	0.379	20	20 53 10.64	2.6672	22 3 0.1	8.674
21	18 43 8.88	2.8007	25 30 23.2	-0.180	21	20 55 50.47	2.6605	21 54 14.9	8.832
22	18 45 56.97	2.8020	25 30 28.0	+0.021	22	20 58 29.90	2.6539	21 45 20.3	8.988
23	18 48 45.12	2.8030	25 30 20.7	0.223	23	21 1 8.94	2.6475	21 36 16.4	9.144
24	18 51 33.33	2.8041	S. 25° 30' 1.3"	0.423	24	21 3 47.60	2.6409	S. 21° 27' 3.1"	9.299

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SUNDAY 21.					TUESDAY 23.				
0	21 <sup>h</sup> 3 <sup>m</sup> 47.60	2.6409	S. 21° 27' 3.1"	9.996	0	23 <sup>h</sup> 2 <sup>m</sup> 3.51	2.9893	S. 11° 44' 52.4"	14.153
1	21 6 25.85	2.6338	21 17 40.7	9.447	1	23 4 20.67	2.9928	11 30 41.7	14.203
2	21 9 3.66	2.6266	21 8 9.5	9.594	2	23 6 37.44	2.9763	11 16 28.1	14.252
3	21 11 41.04	2.6195	20 58 29.4	9.741	3	23 8 53.83	2.9700	11 2 11.5	14.300
4	21 14 18.00	2.6125	20 48 40.6	9.885	4	23 11 9.83	2.9634	10 47 52.1	14.345
5	21 16 54.55	2.6057	20 38 43.2	10.039	5	23 13 25.44	2.9569	10 33 30.1	14.389
6	21 19 30.68	2.5987	20 28 37.2	10.189	6	23 15 40.65	2.9503	10 19 5.5	14.430
7	21 22 6.38	2.5919	20 18 22.9	10.307	7	23 17 55.48	2.9443	10 4 38.5	14.469
8	21 24 41.63	2.5836	20 8 0.4	10.444	8	23 20 9.96	2.9385	9 50 9.3	14.506
9	21 27 16.42	2.5762	19 57 29.7	10.578	9	23 22 24.10	2.9327	9 35 37.8	14.543
10	21 29 50.77	2.5689	19 46 51.1	10.708	10	23 24 37.88	2.9264	9 21 4.2	14.577
11	21 32 24.69	2.5617	19 36 4.7	10.839	11	23 26 51.27	2.9200	9 6 28.6	14.610
12	21 34 58.18	2.5544	19 25 10.5	10.968	12	23 29 4.28	2.9139	8 51 51.0	14.642
13	21 37 31.22	2.5468	19 24 8.7	11.092	13	23 31 16.94	2.9084	8 37 11.6	14.670
14	21 40 3.79	2.5389	19 2 59.5	11.216	14	23 33 29.29	2.9033	8 22 30.6	14.698
15	21 42 35.89	2.5312	18 51 42.8	11.338	15	23 35 41.33	2.1979	8 7 47.9	14.725
16	21 45 7.54	2.5239	18 40 18.9	11.457	16	23 37 53.03	2.1920	7 53 3.7	14.748
17	21 47 38.75	2.5165	18 28 48.0	11.574	17	23 40 4.37	2.1860	7 38 18.2	14.770
18	21 50 9.52	2.5090	18 17 10.1	11.689	18	23 42 15.35	2.1804	7 23 31.3	14.792
19	21 52 39.83	2.5012	18 5 25.4	11.801	19	23 44 26.01	2.1753	7 8 43.2	14.811
20	21 55 9.67	2.4935	17 53 34.0	11.912	20	23 46 36.39	2.1706	6 53 54.0	14.829
21	21 57 39.05	2.4859	17 41 36.0	12.020	21	23 48 46.48	2.1656	6 39 3.8	14.846
22	22 0 7.97	2.4785	17 29 31.6	12.126	22	23 50 56.26	2.1602	6 24 12.7	14.859
23	22 2 36.45	2.4709	S. 17° 17' 20.9"	12.230	23	23 53 5.71	2.1548	S. 6° 9' 20.8"	14.873
MONDAY 22.					WEDNESDAY 24.				
0	22 5 4.48	2.4633	S. 17° 5' 4.0"	12.333	0	23 55 14.84	2.1498	S. 5° 54' 28.0"	14.885
1	22 7 32.05	2.4556	16 52 41.0	12.433	1	23 57 23.68	2.1452	5 39 34.6	14.894
2	22 9 59.15	2.4479	16 40 12.1	12.530	2	23 59 32.26	2.1408	5 24 40.7	14.903
3	22 12 25.79	2.4403	16 27 37.4	12.627	3	0 1 40.57	2.1361	5 9 46.3	14.910
4	22 14 51.98	2.4328	16 14 57.0	12.719	4	0 3 48.60	2.1314	4 54 51.5	14.915
5	22 17 17.72	2.4253	16 2 11.1	12.810	5	0 5 56.34	2.1267	4 39 56.5	14.920
6	22 19 43.01	2.4177	15 49 19.8	12.899	6	0 8 3.80	2.1222	4 25 1.2	14.923
7	22 22 7.85	2.4102	15 36 23.2	12.987	7	0 10 11.00	2.1180	4 10 5.8	14.923
8	22 24 32.24	2.4028	15 23 21.4	13.073	8	0 12 17.96	2.1140	3 55 10.4	14.923
9	22 26 56.19	2.3955	15 10 14.6	13.154	9	0 14 24.68	2.1099	3 40 15.0	14.922
10	22 29 19.70	2.3880	14 57 2.9	13.235	10	0 16 31.15	2.1058	3 25 19.7	14.919
11	22 31 42.76	2.3806	14 43 46.4	13.314	11	0 18 37.37	2.1015	3 10 24.6	14.915
12	22 34 5.37	2.3733	14 30 25.2	13.391	12	0 20 43.33	2.0974	2 55 29.8	14.910
13	22 36 27.55	2.3661	14 16 59.5	13.465	13	0 22 49.05	2.0937	2 40 35.4	14.903
14	22 38 49.30	2.3589	14 3 29.4	13.538	14	0 24 54.57	2.0903	2 25 41.4	14.896
15	22 41 10.62	2.3517	13 49 55.0	13.608	15	0 26 59.88	2.0866	2 10 47.9	14.887
16	22 43 31.51	2.3446	13 36 16.4	13.677	16	0 29 4.97	2.0829	1 55 55.0	14.876
17	22 45 51.97	2.3374	13 22 33.8	13.743	17	0 31 9.83	2.0792	1 41 2.8	14.864
18	22 48 12.00	2.3304	13 8 47.3	13.807	18	0 33 14.47	2.0757	1 26 11.3	14.851
19	22 50 31.61	2.3235	12 54 57.0	13.869	19	0 35 18.91	2.0725	1 11 20.6	14.836
20	22 52 50.81	2.3166	12 41 3.0	13.930	20	0 37 23.16	2.0694	0 56 30.9	14.820
21	22 55 9.60	2.3097	12 27 5.4	13.989	21	0 39 27.24	2.0664	0 41 42.2	14.803
22	22 57 27.98	2.3029	12 13 4.3	14.045	22	0 41 31.13	2.0631	0 26 54.5	14.786
23	22 59 45.95	2.2961	11 59 0.0	14.100	23	0 43 34.82	2.0598	S. 0° 12' 7.9"	14.767
24	23 2 3.51	2.2893	S. 11° 44' 52.4"	14.153	24	0 45 38.31	2.0568	N. 0° 2' 37.5"	14.746

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
THURSDAY 25.					SATURDAY 27.				
0	<sup>h</sup> 0 <sup>m</sup> 45 <sup>s</sup> 38.31	2.0568	N. 0° 2' 37.5"	14.746	0	<sup>h</sup> 2 <sup>m</sup> 22 <sup>s</sup> 28.41	2.0054	N. 11° 7' 42.2"	12.617
1	0 47 41.63	2.0541	0 17 21.6	14.794	1	2 24 28.75	2.0059	11 20 17.3	12.551
2	0 49 44.80	2.0516	0 32 4.4	14.702	2	2 26 29.11	2.0062	11 32 48.4	12.484
3	0 51 47.82	2.0491	0 46 45.9	14.679	3	2 28 29.49	2.0067	11 45 15.4	12.416
4	0 53 50.68	2.0464	1 1 25.9	14.653	4	2 30 29.91	2.0075	11 57 38.4	12.350
5	0 55 53.38	2.0436	1 16 4.3	14.627	5	2 32 30.39	2.0086	12 9 57.4	12.283
6	0 57 55.91	2.0410	1 30 41.2	14.601	6	2 34 30.94	2.0095	12 22 12.4	12.215
7	0 59 58.30	2.0387	1 45 16.5	14.573	7	2 36 31.54	2.0102	12 34 23.2	12.144
8	1 2 0.56	2.0366	1 59 50.0	14.542	8	2 38 32.17	2.0108	12 46 29.7	12.073
9	1 4 2.70	2.0346	2 14 21.7	14.512	9	2 40 32.84	2.0116	12 58 32.0	12.002
10	1 6 4.72	2.0325	2 28 51.5	14.482	10	2 42 33.57	2.0129	13 10 30.0	11.931
11	1 8 6.60	2.0301	2 43 19.5	14.451	11	2 44 34.39	2.0142	13 22 23.7	11.859
12	1 10 8.33	2.0278	2 57 45.6	14.418	12	2 46 35.28	2.0154	13 34 13.1	11.786
13	1 12 9.94	2.0262	3 12 9.7	14.383	13	2 48 36.24	2.0165	13 45 58.1	11.712
14	1 14 11.47	2.0248	3 26 31.6	14.346	14	2 50 37.26	2.0175	13 57 38.6	11.636
15	1 16 12.91	2.0232	3 40 51.3	14.310	15	2 52 38.34	2.0187	14 9 14.5	11.560
16	1 18 14.25	2.0214	3 55 8.8	14.274	16	2 54 39.50	2.0201	14 20 45.9	11.485
17	1 20 15.47	2.0194	4 9 24.2	14.237	17	2 56 40.75	2.0216	14 32 12.8	11.410
18	1 22 16.57	2.0178	4 23 37.3	14.198	18	2 58 42.09	2.0230	14 43 35.1	11.332
19	1 24 17.58	2.0164	4 37 48.0	14.157	19	3 0 43.51	2.0244	14 54 52.7	11.254
20	1 26 18.54	2.0155	4 51 56.2	14.116	20	3 2 45.01	2.0257	15 6 5.6	11.176
21	1 28 19.44	2.0143	5 6 1.9	14.073	21	3 4 46.60	2.0272	15 17 13.8	11.097
22	1 30 20.26	2.0129	5 20 5.0	14.030	22	3 6 48.28	2.0287	15 28 17.2	11.016
23	1 32 20.99	2.0114	N. 5 34 5.5	13.987	23	3 8 50.05	2.0304	N. 15 39 15.7	10.935
FRIDAY 26.					SUNDAY 28.				
0	1 34 21.63	2.0101	N. 5 48 3.5	13.944	0	3 10 51.93	2.0329	N. 15 50 9.4	10.854
1	1 36 22.21	2.0093	6 1 58.8	13.897	1	3 12 53.91	2.0337	16 0 58.2	10.771
2	1 38 22.75	2.0087	6 15 51.2	13.849	2	3 14 55.98	2.0353	16 11 42.0	10.689
3	1 40 23.26	2.0081	6 29 40.7	13.801	3	3 16 58.15	2.0370	16 22 20.9	10.606
4	1 42 23.72	2.0071	6 43 27.3	13.753	4	3 19 0.43	2.0388	16 32 54.8	10.521
5	1 44 24.11	2.0061	6 57 11.1	13.706	5	3 21 2.81	2.0407	16 43 23.5	10.435
6	1 46 24.45	2.0054	7 10 52.1	13.657	6	3 23 5.31	2.0426	16 53 47.1	10.350
7	1 48 24.76	2.0050	7 24 30.0	13.605	7	3 25 7.92	2.0444	17 4 5.6	10.265
8	1 50 25.05	2.0046	7 38 4.7	13.551	8	3 27 10.64	2.0462	17 14 18.9	10.179
9	1 52 25.31	2.0041	7 51 36.2	13.499	9	3 29 13.46	2.0480	17 24 27.1	10.093
10	1 54 25.54	2.0037	8 5 4.6	13.446	10	3 31 16.40	2.0500	17 34 30.1	10.005
11	1 56 25.75	2.0034	8 18 29.8	13.393	11	3 33 19.46	2.0520	17 44 27.7	9.914
12	1 58 25.95	2.0033	8 31 51.8	13.339	12	3 35 22.64	2.0540	17 54 19.8	9.824
13	2 0 26.14	2.0031	8 45 10.5	13.282	13	3 37 25.94	2.0560	18 4 6.6	9.736
14	2 2 26.32	2.0026	8 58 25.7	13.224	14	3 39 29.36	2.0580	18 13 48.1	9.646
15	2 4 26.48	2.0027	9 11 37.5	13.166	15	3 41 32.90	2.0600	18 23 24.1	9.554
16	2 6 26.64	2.0027	9 24 45.8	13.109	16	3 43 36.56	2.0620	18 32 54.6	9.462
17	2 8 26.81	2.0030	9 37 50.6	13.051	17	3 45 40.35	2.0642	18 42 19.6	9.371
18	2 10 27.00	2.0033	9 50 52.0	12.992	18	3 47 44.27	2.0663	18 51 39.1	9.278
19	2 12 27.20	2.0033	10 3 49.7	12.931	19	3 49 48.31	2.0684	19 0 53.0	9.184
20	2 14 27.40	2.0034	10 16 43.7	12.869	20	3 51 52.48	2.0707	19 10 1.2	9.089
21	2 16 27.61	2.0037	10 29 34.0	12.806	21	3 53 56.79	2.0729	19 19 3.7	8.994
22	2 18 27.84	2.0041	10 42 20.5	12.743	22	3 56 1.22	2.0749	19 28 0.5	8.899
23	2 20 28.10	2.0047	10 55 3.2	12.681	23	3 58 5.78	2.0771	19 36 51.6	8.803
24	2 22 28.41	2.0054	N. 11 7 42.2	12.617	24	4 0 10.47	2.0792	N. 19 45 36.9	8.706

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
MONDAY 29.					WEDNESDAY 31.				
0	4 0 10.47	2.0792	N.19 45 36.9	8.708	0	5 42 24.75	2.1731	N.24 42 6.7	3.471
1	4 2 15.29	2.0815	19 54 16.4	8.609	1	5 44 35.17	2.1743	24 45 31.4	3.351
2	4 4 20.25	2.0837	20 2 50.0	8.511	2	5 46 45.66	2.1755	24 48 48.8	3.228
3	4 6 25.34	2.0859	20 11 17.8	8.414	3	5 48 56.23	2.1767	24 51 58.9	3.107
4	4 8 30.56	2.0880	20 19 39.7	8.315	4	5 51 6.86	2.1777	24 55 1.8	2.990
5	4 10 35.91	2.0904	20 27 55.6	8.215	5	5 53 17.55	2.1787	24 57 57.7	2.872
6	4 12 41.40	2.0926	20 36 5.5	8.115	6	5 55 28.31	2.1798	25 0 46.5	2.752
7	4 14 47.02	2.0949	20 44 9.4	8.014	7	5 57 39.13	2.1808	25 3 28.0	2.632
8	4 16 52.78	2.0971	20 52 7.2	7.913	8	5 59 50.00	2.1816	25 6 2.3	2.511
9	4 18 58.67	2.0993	20 59 59.0	7.812	9	6 2 0.92	2.1825	25 8 29.3	2.389
10	4 21 4.69	2.1015	21 7 44.7	7.710	10	6 4 11.89	2.1832	25 10 49.0	2.268
11	4 23 10.85	2.1037	21 15 24.2	7.608	11	6 6 22.90	2.1838	25 13 1.5	2.148
12	4 25 17.14	2.1059	21 22 57.5	7.509	12	6 8 33.95	2.1845	25 15 6.8	2.027
13	4 27 23.56	2.1082	21 30 24.5	7.398	13	6 10 45.05	2.1852	25 17 4.8	1.906
14	4 29 30.12	2.1104	21 37 45.3	7.285	14	6 12 56.18	2.1857	25 18 55.5	1.783
15	4 31 36.81	2.1125	21 44 59.9	7.190	15	6 15 7.34	2.1862	25 20 38.8	1.661
16	4 33 43.63	2.1147	21 52 8.2	7.085	16	6 17 18.53	2.1866	25 22 14.8	1.539
17	4 35 50.58	2.1170	21 59 10.1	6.977	17	6 19 29.74	2.1870	25 23 43.5	1.418
18	4 37 57.66	2.1191	22 6 5.5	6.870	18	6 21 40.98	2.1874	25 25 5.0	1.297
19	4 40 4.87	2.1213	22 12 54.5	6.763	19	6 23 52.23	2.1876	25 26 19.2	1.175
20	4 42 12.21	2.1236	22 19 37.1	6.657	20	6 26 3.50	2.1879	25 27 26.0	1.051
21	4 44 19.69	2.1255	22 26 13.4	6.551	21	6 28 14.78	2.1880	25 28 25.4	0.929
22	4 46 27.29	2.1277	22 32 43.2	6.442	22	6 30 26.07	2.1881	25 29 17.5	0.807
23	4 48 35.01	2.1297	N.22 39 6.4	6.331	23	6 32 37.36	2.1881	N.25 30 2.3	0.685
TUESDAY 30.					THURSDAY, AUGUST 1.				
0	4 50 42.86	2.1300	N.22 45 22.9	6.220	0	6 34 48.65	2.1881	N.25 30 39.7	0.561
1	4 52 50.84	2.1340	22 51 32.8	6.111	PHASES OF THE MOON.				
2	4 54 58.94	2.1359	22 57 36.2	6.009					
3	4 57 7.15	2.1379	23 3 33.0	5.891					
4	4 59 15.49	2.1400	23 9 23.1	5.779					
5	5 1 23.95	2.1420	23 15 6.5	5.666	● New Moon, . . . 5 6 24.8 ☾ First Quarter, . . . 13 7 48.2 ○ Full Moon, . . . 20 1 53.5 ☾ Last Quarter, . . . 26 19 19.3				
6	5 3 32.52	2.1439	23 20 43.1	5.554					
7	5 5 41.21	2.1458	23 26 13.0	5.442					
8	5 7 50.01	2.1477	23 31 36.2	5.330					
9	5 9 58.93	2.1496	23 36 52.6	5.216	☾ Apogee, . . . . . 6 12.4 ☾ Perigee, . . . . . 20 1.3				
10	5 12 7.96	2.1514	23 42 2.2	5.102					
11	5 14 17.10	2.1532	23 47 4.9	4.987					
12	5 16 26.34	2.1549	23 52 0.7	4.872					
13	5 18 35.69	2.1567	23 56 49.6	4.757					
14	5 20 45.14	2.1582	24 1 31.6	4.642					
15	5 22 54.68	2.1598	24 6 6.7	4.526					
16	5 25 4.32	2.1615	24 10 34.8	4.410					
17	5 27 14.06	2.1631	24 14 55.9	4.294					
18	5 29 23.90	2.1647	24 19 10.1	4.178					
19	5 31 33.83	2.1662	24 23 17.3	4.061					
20	5 33 43.84	2.1676	24 27 17.4	3.942					
21	5 35 53.94	2.1691	24 31 10.3	3.822					
22	5 38 4.13	2.1705	24 34 56.1	3.705					
23	5 40 14.40	2.1717	24 38 34.9	3.588					
24	5 42 24.75	2.1731	N.24 42 6.7	3.471					



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Diff.	III <sup>h</sup> .	P. L. of Diff.	VI <sup>h</sup> .	P. L. of Diff.	IX <sup>h</sup> .	P. L. of Diff.
1	Fomalhaut W.	80 36 14	3061	82 5 11	3069	83 33 58	3077	85 2 36	3083
	α Pegasi W.	63 26 17	3408	64 48 24	3404	66 10 36	3401	67 32 51	3398
	SUN E.	47 13 7	3943	45 47 49	3953	44 22 43	3963	42 57 48	3979
2	Fomalhaut W.	92 23 36	3120	93 51 21	3128	95 18 57	3135	96 46 24	3142
	α Pegasi W.	74 24 43	3393	75 47 7	3393	77 9 31	3395	78 31 53	3397
	α Arietis W.	30 47 14	3398	32 9 33	3369	33 32 25	3343	34 55 47	3322
	SUN E.	35 55 53	3317	34 32 1	3325	33 8 19	3333	31 44 46	3342
7	SUN W.	19 15 53	3484	20 36 35	3478	21 57 24	3479	23 18 19	3467
	Regulus E.	23 52 25	3165	22 25 34	3178	20 58 58	3193	19 32 40	3211
	Spica E.	77 49 2	3101	76 20 54	3101	74 52 45	3101	73 24 36	3100
	Antares E.	123 43 30	3098	122 15 18	3097	120 47 5	3096	119 18 50	3095
8	SUN W.	30 4 4	3448	31 25 26	3445	32 46 52	3440	34 8 23	3436
	Spica E.	66 3 34	3094	64 35 17	3093	63 6 59	3091	61 38 38	3088
	Antares E.	111 57 4	3083	110 28 34	3081	109 0 1	3078	107 31 24	3074
9	SUN W.	40 57 15	3412	42 19 18	3406	43 41 28	3400	45 3 44	3394
	Spica E.	54 16 9	3075	52 47 29	3073	51 18 46	3069	49 49 59	3065
	Antares E.	100 7 14	3055	98 38 9	3050	97 8 58	3045	95 39 41	3039
10	SUN W.	51 56 56	3359	53 19 59	3351	54 43 12	3343	56 6 34	3333
	Regulus W.	13 2 9	3944	14 27 17	3197	15 53 30	3156	17 20 32	3121
	Spica E.	42 24 57	3047	40 55 42	3043	39 26 22	3039	37 56 57	3034
	Antares E.	88 11 28	3008	86 41 25	3001	85 11 14	2993	83 40 53	2986
11	SUN W.	63 6 6	3284	64 30 36	3274	65 55 18	3262	67 20 14	3251
	Regulus W.	24 44 46	3000	26 14 59	2983	27 45 33	2966	29 16 28	2950
	Spica E.	30 28 56	3024	28 59 13	3024	27 29 30	3025	25 59 48	3026
	Antares E.	76 6 34	2949	74 35 8	2932	73 3 30	2923	71 31 40	2912
	Saturn E.	115 19 34	2908	113 47 25	2897	112 15 2	2887	110 42 27	2876
	α Aquilæ E.	119 6 2	3984	117 54 7	3944	116 41 32	3907	115 28 19	3871
12	SUN W.	74 28 29	3186	75 54 55	3173	77 21 37	3158	78 48 36	3143
	Regulus W.	36 56 7	2872	38 29 2	2856	40 2 17	2841	41 35 52	2826
	Antares E.	63 48 58	2855	62 15 41	2842	60 42 8	2830	59 8 19	2817
	Saturn E.	102 55 50	2816	101 21 43	2804	99 47 20	2791	98 12 40	2777
	α Aquilæ E.	109 13 28	3710	107 56 52	3683	106 39 47	3655	105 22 12	3629
13	SUN W.	86 8 8	3065	87 37 0	3048	89 6 13	3031	90 35 47	3014
	Regulus W.	49 28 50	2746	51 4 29	2729	52 40 30	2711	54 16 53	2695
	Antares E.	51 14 54	2749	49 39 19	2735	48 3 26	2721	46 27 14	2706
	Saturn E.	90 14 43	2704	88 38 9	2689	87 1 14	2673	85 23 58	2659
	α Aquilæ E.	98 47 29	3510	97 27 16	3489	96 6 40	3470	94 45 42	3449
14	SUN W.	98 9 5	2924	99 40 53	2905	101 13 5	2887	102 45 41	2869
	Regulus W.	62 24 34	2809	64 3 17	2591	65 42 25	2572	67 21 58	2554
	Antares E.	38 21 18	2634	36 43 9	2620	35 4 41	2607	33 25 56	2594
	Saturn E.	77 12 13	2574	75 32 43	2558	73 52 50	2540	72 12 32	2522
	α Aquilæ E.	87 55 31	3362	86 32 31	3348	85 9 15	3334	83 45 43	3322
	Fomalhaut E.	120 39 28	2921	119 5 28	2798	117 30 58	2774	115 55 56	2750
15	SUN W.	110 34 50	2772	112 9 55	2752	113 45 26	2733	115 21 22	2713
	Regulus W.	75 46 1	2469	77 28 7	2444	79 10 39	2426	80 53 37	2407

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.		Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
1	Fomalhaut W.		86 31 6	3091	87 59 27	3098	89 27 39	3105	90 55 42	3113
	α Pegasi W.		68 55 10	3396	70 17 31	3394	71 39 54	3393	73 2 18	3393
	Sun E.		41 33 4	3989	40 8 31	3990	38 44 8	3999	37 19 55	3308
2	Fomalhaut W.		98 13 43	3150	99 40 52	3158	101 7 52	3165	102 34 43	3173
	α Pegasi W.		79 54 13	3399	81 16 31	3401	82 38 46	3404	84 0 58	3408
	α Arietis W.		36 19 33	3303	37 43 41	3298	39 8 7	3274	40 32 49	3263
	Sun E.		30 21 23	3349	28 58 8	3357	27 35 2	3365	26 12 6	3373
7	Sun W.		24 39 20	3464	26 0 27	3460	27 21 36	3456	28 42 49	3452
	Regulus E.		18 6 44	3236	16 41 17	3265	15 16 24	3300	13 52 12	3349
	Spica E.		71 56 26	3099	70 28 15	3098	69 0 3	3096	67 31 49	3096
	Antares E.		117 50 34	3092	116 22 15	3091	114 53 54	3088	113 25 30	3087
8	Sun W.		35 29 59	3431	36 51 40	3427	38 13 26	3422	39 35 18	3417
	Spica E.		60 10 14	3067	58 41 48	3083	57 13 18	3081	55 44 45	3078
	Antares E.		106 2 43	3071	104 33 58	3067	103 5 8	3064	101 36 14	3059
9	Sun W.		46 26 7	3388	47 48 37	3381	49 11 15	3374	50 34 1	3366
	Spica E.		48 21 7	3062	46 52 11	3059	45 23 11	3055	43 54 6	3052
	Antares E.		94 10 17	3034	92 40 46	3028	91 11 8	3022	89 41 22	3015
10	Sun W.		57 30 7	3325	58 53 50	3315	60 17 44	3306	61 41 49	3295
	Regulus W.		18 48 16	3090	20 16 38	3063	21 45 33	3039	23 14 57	3019
	Spica E.		36 27 27	3032	34 57 54	3029	33 28 17	3026	31 58 37	3026
	Antares E.		82 10 23	2977	80 39 42	2969	79 8 51	2960	77 37 48	2951
11	Sun W.		68 45 23	3238	70 10 47	3225	71 36 26	3213	73 2 20	3200
	Regulus W.		30 47 44	2934	32 19 20	2918	33 51 16	2902	35 23 32	2887
	Spica E.		24 30 10	3034	23 0 39	3043	21 31 19	3055	20 2 14	3076
	Antares E.		69 59 36	2901	68 27 18	2890	66 54 46	2878	65 21 59	2867
	Saturn E.		109 9 37	2865	107 36 33	2853	106 3 14	2849	104 29 40	2839
	α Aquilæ E.		114 14 30	2836	113 0 5	2803	111 45 6	2770	110 29 33	2740
12	Sun W.		80 15 53	3129	81 43 28	3113	83 11 22	3097	84 39 35	3081
	Regulus W.		43 9 46	2810	44 44 1	2795	46 18 36	2779	47 53 32	2762
	Antares E.		57 34 13	2804	55 59 50	2790	54 25 9	2777	52 50 11	2763
	Saturn E.		96 37 42	2763	95 2 26	2749	93 26 51	2735	91 50 57	2719
	α Aquilæ E.		104 4 9	2603	102 45 38	2579	101 26 41	2555	100 7 18	2532
13	Sun W.		92 5 42	2997	93 35 59	2979	95 6 38	2961	96 37 40	2942
	Regulus W.		55 53 39	2679	57 30 47	2661	59 8 19	2643	60 46 15	2626
	Antares E.		44 50 42	2691	43 13 50	2676	41 36 38	2663	39 59 8	2648
	Saturn E.		83 46 23	2641	82 8 24	2626	80 30 4	2609	78 51 21	2591
	α Aquilæ E.		93 24 21	2430	92 2 38	2412	90 40 35	2394	89 18 12	2379
14	Sun W.		104 18 41	2848	105 52 6	2829	107 25 56	2811	109 0 10	2791
	Regulus W.		69 1 56	2536	70 42 19	2518	72 23 7	2499	74 4 21	2481
	Antares E.		31 46 53	2522	30 7 33	2570	28 27 57	2559	26 48 5	2550
	Saturn E.		70 31 49	2504	68 50 42	2487	67 9 10	2469	65 27 13	2452
	α Aquilæ E.		82 21 57	2309	80 57 56	2289	79 33 43	2269	78 9 19	2262
	Fomalhaut E.		114 20 23	2727	112 44 19	2704	111 7 44	2681	109 30 39	2658
15	Sun W.		116 57 44	2694	118 34 32	2675	120 11 46	2656	121 49 25	2637
	Regulus W.		82 37 2	2389	84 20 53	2370	86 5 11	2352	87 49 55	2334

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
15	Spica W.	22 12 53	2608	23 51 37	2649	25 31 14	2635	27 11 39	2663
	Antares E.	25 8 1	2543	23 27 47	2638	21 47 26	2637	20 7 4	2544
	Saturn E.	63 44 52	2433	62 2 5	2415	60 18 52	2398	58 35 14	2380
	α Aquilæ E.	76 44 46	2275	75 20 5	2270	73 55 18	2266	72 30 27	2265
	Fomalhaut E.	107 53 3	2637	106 14 58	2615	104 36 23	2594	102 57 20	2573
	α Pegasi E.	124 22 25	3064	122 53 31	3023	121 23 47	2985	119 53 15	2948
16	Sun W.	123 27 30	2618	125 6 1	2600	126 44 56	2582	128 24 16	2564
	Regulus W.	89 35 5	2315	91 20 42	2298	93 6 44	2281	94 53 12	2264
	Spica W.	35 44 1	2370	37 28 19	2346	39 13 11	2324	40 58 35	2303
	Saturn E.	49 50 38	2291	48 4 26	2274	46 17 49	2258	44 30 48	2241
	α Aquilæ E.	05 26 25	2296	64 1 57	2300	62 37 45	2315	61 13 51	2335
	Fomalhaut E.	94 35 3	2475	92 53 14	2457	91 11 0	2438	89 28 20	2422
	α Pegasi E.	112 9 22	2782	110 34 31	2753	108 59 2	2726	107 22 57	2699
17	Regulus W.	103 51 47	2182	105 40 42	2167	107 30 0	2151	109 19 41	2137
	Spica W.	49 53 4	2207	51 41 21	2189	53 30 5	2172	55 19 14	2156
	Saturn E.	35 29 47	2167	33 40 29	2153	31 50 51	2141	30 0 54	2130
	α Aquilæ E.	54 21 34	2501	53 1 11	2554	51 41 46	2611	50 23 24	2677
	Fomalhaut E.	80 49 11	2345	79 4 17	2331	77 19 3	2320	75 33 32	2308
	α Pegasi E.	99 14 11	2686	97 34 57	2667	95 55 17	2650	94 15 13	2633
18	Spica W.	64 30 50	2085	66 22 12	2073	68 13 53	2061	70 5 52	2051
	Antares W.	18 52 11	2200	20 40 39	2166	22 29 58	2136	24 20 3	2111
	α Aquilæ E.	44 12 51	4191	43 4 16	4340	41 58 0	4512	40 54 19	4708
	Fomalhaut E.	66 42 10	2266	64 55 20	2260	63 8 22	2257	61 21 19	2256
	α Pegasi E.	85 49 39	2470	84 7 43	2460	82 25 34	2454	80 43 16	2448
19	Spica W.	79 29 33	2009	81 22 54	2002	83 16 25	1997	85 10 4	1992
	Antares W.	33 38 4	2033	35 30 46	2023	37 23 45	2014	39 16 57	2007
	Fomalhaut E.	52 26 14	2273	50 39 35	2264	48 53 12	2266	47 7 7	2213
	α Pegasi E.	72 10 28	2444	70 27 56	2450	68 45 32	2458	67 3 19	2467
	α Arietis E.	114 19 13	2118	112 28 41	2108	110 37 54	2099	108 46 54	2092
20	Spica W.	94 39 41	1982	96 33 43	1983	98 27 44	1984	100 21 43	1987
	Antares W.	48 45 19	1986	50 39 15	1985	52 33 13	1985	54 27 11	1986
	Fomalhaut E.	38 24 34	2462	36 42 27	2508	35 1 25	2563	33 21 39	2627
	α Pegasi E.	58 36 42	2553	56 56 43	2680	55 17 21	2612	53 38 42	2646
	α Arietis E.	99 29 43	2073	97 38 2	2073	95 46 21	2073	93 54 40	2075
21	Spica W.	109 50 14	2012	111 43 30	2019	113 36 35	2027	115 29 27	2036
	Antares W.	63 56 13	2004	65 49 41	2010	67 43 0	2017	69 36 8	2024
	Saturn W.	25 25 50	1998	27 19 27	2001	29 12 59	2005	31 6 25	2010
	α Pegasi E.	45 39 17	2202	44 7 1	2273	42 36 15	2355	41 7 10	3143
	α Arietis E.	84 37 24	2098	82 46 21	2105	80 55 30	2114	79 4 52	2123
	Aldebaran E.	115 10 36	2005	113 17 10	2012	111 23 54	2019	109 30 49	2026
22	Antares W.	78 58 26	2073	80 50 6	2086	82 41 27	2098	84 32 29	2111
	α Aquilæ W.	43 9 4	4182	44 17 47	4049	45 28 38	3937	46 41 20	3839
	Saturn W.	40 30 58	2052	42 23 11	2064	44 15 6	2075	46 6 43	2088
	α Arietis E.	69 55 49	2186	68 7 0	2202	66 18 35	2218	64 30 34	2235
	Aldebaran E.	100 8 46	2075	98 17 9	2088	96 25 51	2100	94 34 52	2113
23	Antares W.	93 42 23	2184	95 31 14	2200	97 19 41	2217	99 7 43	2233
	Saturn W.	55 19 47	2158	57 9 18	2173	58 58 26	2189	60 47 10	2205

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Diff.	XVb.	P. L. of Diff.	XVIIIb.	P. L. of Diff.	XXIb.	P. L. of Diff.
15	Spica W.	28 52 48	2473	30 34 39	2445	32 17 9	2419	34 0 17	2394
	Antares E.	18 26 52	2558	16 46 59	2581	15 7 38	2616	13 29 5	2665
	Saturn E.	56 51 10	2302	55 6 40	2344	53 21 45	2396	51 36 24	2309
	$\alpha$ Aquilæ E.	71 5 34	2364	69 40 40	2366	68 15 49	2370	66 51 3	2377
	Fomalhaut E.	101 17 48	2553	99 37 48	2533	97 57 20	2513	96 16 25	2494
	$\alpha$ Pegasi E.	118 21 57	2911	116 49 52	2877	115 17 4	2844	113 43 33	2813
16	SUN W.	130 4 0	2546	131 44 9	2530	133 24 41	2512	135 5 37	2497
	Regulus W.	96 40 5	2546	98 27 24	2530	100 15 7	2513	102 3 15	2197
	Spica W.	42 44 30	2283	44 30 55	2262	46 17 50	2243	48 5 13	2225
	Saturn E.	42 43 22	2226	40 55 33	2210	39 7 20	2195	37 18 45	2180
	$\alpha$ Aquilæ E.	59 50 20	2358	58 27 15	2366	57 4 42	2419	55 42 47	2456
	Fomalhaut E.	87 45 16	2405	86 1 48	2389	84 17 57	2374	82 33 45	2359
	$\alpha$ Pegasi E.	105 46 16	2675	104 9 2	2650	102 31 15	2626	100 52 58	2606
17	Regulus W.	111 9 43	2124	113 0 6	2111	114 50 49	2098	116 41 52	2086
	Spica W.	57 8 48	2140	58 58 46	2126	60 49 6	2111	62 39 48	2098
	Saturn E.	28 10 40	2119	26 20 10	2110	24 29 26	2103	22 38 31	2096
	$\alpha$ Aquilæ E.	49 6 13	2755	47 50 26	2742	46 36 7	2744	45 23 12	2692
	Fomalhaut E.	73 47 44	2296	72 1 39	2287	70 15 21	2279	68 28 51	2271
	$\alpha$ Pegasi E.	92 34 46	2517	90 53 57	2503	89 12 48	2490	87 31 21	2480
18	Spica W.	71 58 7	2041	73 50 38	2031	75 43 24	2023	77 36 23	2016
	Antares W.	26 10 45	2091	28 1 58	2073	29 53 38	2059	31 45 41	2046
	$\alpha$ Aquilæ E.	39 53 27	2936	38 55 41	2197	38 1 17	2500	37 10 33	2583
	Fomalhaut E.	59 34 14	2255	57 47 8	2256	56 0 3	2260	54 13 4	2266
	$\alpha$ Pegasi E.	79 0 49	2443	77 18 16	2441	75 35 40	2441	73 53 3	2442
19	Spica W.	87 3 51	1989	88 57 43	1966	90 51 40	1964	92 45 40	1963
	Antares W.	41 10 21	2000	43 3 55	1995	44 57 37	1991	46 51 26	1988
	Fomalhaut E.	45 21 26	2332	43 36 13	2355	41 51 34	2365	40 7 39	2421
	$\alpha$ Pegasi E.	65 21 19	2478	63 39 35	2493	61 58 12	2510	60 17 13	2530
	$\alpha$ Arietis E.	106 55 43	2096	105 4 23	2081	103 12 55	2077	101 21 21	2075
20	Spica W.	102 15 38	1990	104 9 28	1994	106 3 11	1999	107 56 47	2005
	Antares W.	56 21 8	1987	58 15 2	1990	60 8 52	1994	62 2 36	1998
	Fomalhaut E.	31 43 21	2704	30 6 46	2800	28 32 18	2915	27 0 18	3069
	$\alpha$ Pegasi E.	52 0 50	2686	50 23 51	2729	48 47 50	2781	47 12 57	2837
	$\alpha$ Arietis E.	92 3 2	2077	90 11 28	2081	88 19 59	2065	86 28 37	2091
21	Spica W.	117 22 5	2046	119 14 28	2057	121 6 34	2068	122 58 23	2081
	Antares W.	71 29 5	2033	73 21 48	2042	75 14 16	2052	77 6 29	2062
	Saturn W.	32 59 43	2017	34 52 51	2025	36 45 47	2033	38 38 30	2042
	$\alpha$ Pegasi E.	39 39 53	2343	38 14 35	2355	36 51 27	2498	35 31 1	2687
	$\alpha$ Arietis E.	77 14 28	2134	75 24 21	2145	73 34 31	2158	71 45 0	2171
	Aldebaran E.	107 37 56	2035	105 45 16	2044	103 52 50	2054	102 0 40	2064
22	Antares W.	86 23 11	2125	88 13 32	2139	90 3 31	2154	91 53 8	2169
	$\alpha$ Aquilæ W.	47 55 42	2751	49 11 35	2675	50 28 49	2607	51 47 16	2549
	Saturn W.	47 58 1	2101	49 48 59	2114	51 39 37	2128	53 29 53	2143
	$\alpha$ Arietis E.	62 42 59	2253	60 55 51	2273	59 9 12	2294	57 23 3	2315
	Aldebaran E.	92 44 13	2127	90 53 55	2141	89 3 58	2156	87 14 24	2171
23	Antares W.	100 55 21	2251	102 42 33	2268	104 29 19	2285	106 15 40	2304
	Saturn W.	62 35 30	2222	64 23 25	2239	66 10 55	2256	67 58 0	2273

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Diff.	III <sup>h</sup> .	P. L. of Diff.	VI <sup>h</sup> .	P. L. of Diff.	IX <sup>h</sup> .	P. L. of Diff.
23	$\alpha$ Aquilæ W.	53° 6' 46"	3490	54° 27' 11"	3456	55° 48' 24"	3417	57° 10' 21"	3365
	$\alpha$ Arietis E.	55 37 26	2338	53 52 22	2362	52 7 52	2387	50 23 58	2414
	Aldebaran E.	85 25 13	2187	83 36 26	2303	81 48 2	2219	80 0 3	2236
	SUN E.	138 28 15	2485	136 46 40	2500	135 5 27	2517	133 24 37	2534
24	Antares W.	108 1 34	2322	109 47 1	2340	111 32 2	2359	113 16 36	2378
	Saturn W.	69 44 39	2291	71 30 52	2309	73 16 39	2326	75 2 0	2344
	$\alpha$ Aquilæ W.	64 7 40	3288	65 32 6	3279	66 56 42	3271	68 21 27	3267
	Fomalhaut W.	28 44 12	3125	30 11 51	3066	31 40 42	3015	33 10 36	2973
	$\alpha$ Arietis E.	41 54 40	2571	40 15 5	2609	38 36 22	2650	36 58 35	2665
	Aldebaran E.	71 6 31	2325	69 21 8	2343	67 36 11	2362	65 51 41	2380
	SUN E.	125 6 28	2624	123 28 5	2642	121 50 7	2661	120 12 35	2681
25	Saturn W.	83 42 12	2436	85 24 56	2453	87 7 15	2473	88 49 8	2490
	$\alpha$ Aquilæ W.	75 25 35	3277	76 50 13	3283	78 14 44	3282	79 39 5	3300
	Fomalhaut W.	40 50 18	2864	42 23 23	2856	43 56 38	2852	45 29 59	2849
	$\alpha$ Pegasi W.	30 12 20	4778	31 12 14	4567	32 15 7	4391	33 20 36	4241
	Aldebaran E.	57 15 58	2476	55 34 11	2496	53 52 52	2515	52 11 59	2535
	SUN E.	112 11 24	2778	110 36 27	2798	109 1 56	2817	107 27 50	2836
26	Saturn W.	97 12 18	2578	98 51 43	2596	100 30 44	2612	102 9 22	2630
	$\alpha$ Aquilæ W.	86 37 40	3365	88 0 36	3381	89 23 14	3396	90 45 33	3415
	Fomalhaut W.	53 16 42	2863	54 49 48	2869	56 22 46	2877	57 55 34	2886
	$\alpha$ Pegasi W.	39 17 25	3768	40 33 3	3704	41 49 46	3650	43 7 26	3607
	Aldebaran E.	43 54 21	2632	42 16 10	2652	40 38 25	2672	39 1 7	2691
	SUN E.	99 43 33	2931	98 11 54	2950	96 40 39	2969	95 9 47	2986
27	Saturn W.	110 16 59	2710	111 53 26	2724	113 29 34	2740	115 5 21	2754
	$\alpha$ Aquilæ W.	97 31 59	3514	98 52 8	3535	100 11 53	3552	101 31 13	3562
	Fomalhaut W.	65 36 44	2932	67 8 22	2942	68 39 48	2952	70 11 1	2963
	$\alpha$ Pegasi W.	49 45 42	3463	51 6 48	3446	52 28 13	3430	53 49 56	3417
	Aldebaran E.	31 1 21	2795	29 26 47	2818	27 52 43	2842	26 19 9	2866
	SUN E.	87 40 58	3073	86 12 16	3090	84 43 54	3105	83 15 51	3122
28	$\alpha$ Aquilæ W.	108 1 9	3714	109 17 41	3744	110 33 42	3775	111 49 10	3807
	Fomalhaut W.	77 43 40	3017	79 13 32	3028	80 43 10	3039	82 12 35	3049
	$\alpha$ Pegasi W.	60 41 10	3384	62 3 45	3379	63 26 25	3378	64 49 7	3376
	SUN E.	76 0 19	3196	74 34 5	3210	73 8 8	3223	71 42 26	3236
29	Fomalhaut W.	89 36 30	3100	91 4 40	3110	92 32 38	3119	94 0 24	3129
	$\alpha$ Pegasi W.	71 42 42	3380	73 5 21	3383	74 27 57	3385	75 50 31	3388
	$\alpha$ Arietis W.	28 7 3	3453	29 28 20	3414	30 50 21	3382	32 12 58	3356
	SUN E.	64 37 40	3226	63 13 24	3307	61 49 21	3318	60 25 30	3288
30	Fomalhaut W.	101 16 25	3176	102 43 3	3184	104 9 31	3193	105 35 48	3202
	$\alpha$ Pegasi W.	82 42 20	3408	84 4 28	3412	85 26 31	3416	86 48 29	3422
	$\alpha$ Arietis W.	39 12 13	3374	40 36 55	3384	42 1 49	3355	43 26 53	3348
	SUN E.	53 29 4	3374	52 6 18	3382	50 43 41	3390	49 21 13	3396
31	Fomalhaut W.	112 44 37	3247	114 9 51	3256	115 34 54	3265	116 59 46	3276
	$\alpha$ Pegasi W.	93 36 49	3449	94 58 10	3454	96 19 25	3461	97 40 33	3468
	$\alpha$ Arietis W.	50 33 57	3225	51 59 37	3221	53 25 21	3219	54 51 8	3215
	Aldebaran W.	19 13 3	3196	20 39 17	3181	22 5 49	3168	23 32 36	3159
	SUN E.	42 31 0	3432	41 9 20	3439	39 47 48	3446	38 26 23	3451

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Diff.	XV <sup>h</sup> .	P. L. of Diff.	XVIII <sup>h</sup> .	P. L. of Diff.	XXI <sup>h</sup> .	P. L. of Diff.
23	$\alpha$ Aquilæ W.	58 32 55	3358	59 56 0	3334	61 19 32	3314	62 43 27	3299
	$\alpha$ Arietis E.	48 40 43	2442	46 58 8	2471	45 16 14	2502	43 35 4	2535
	Aldebaran E.	78 12 29	2253	76 25 21	2270	74 38 38	2288	72 52 21	2307
	Sun E.	131 44 11	2551	130 4 8	2569	128 24 30	2587	126 45 17	2604
24	Antares W.	115 0 43	2396	116 44 23	2415	118 27 36	2434	120 10 22	2453
	Saturn W.	76 46 55	2369	78 31 24	2381	80 15 26	2399	81 59 2	2417
	$\alpha$ Aquilæ W.	69 46 17	2385	71 11 9	2386	72 36 0	2367	74 0 50	2371
	Fomalhaut W.	34 41 22	2939	36 12 51	2912	37 44 55	2891	39 17 26	2874
	$\alpha$ Arietis E.	35 21 48	2743	33 46 5	2796	32 11 32	2855	30 38 15	2919
	Aldebaran E.	64 7 38	2399	62 24 2	2418	60 40 53	2436	58 58 12	2457
	Sun E.	118 35 29	2700	116 58 49	2719	115 22 35	2739	113 46 47	2758
25	Saturn W.	90 30 35	2507	92 11 38	2525	93 52 16	2543	95 32 29	2561
	$\alpha$ Aquilæ W.	81 3 16	3313	82 27 13	3394	83 50 57	3337	85 14 26	3350
	Fomalhaut W.	47 3 23	2949	48 36 47	2851	50 10 9	2853	51 43 28	2857
	$\alpha$ Pegasi W.	34 28 23	4114	35 38 11	4005	36 49 46	3911	38 2 55	3831
	Aldebaran E.	50 31 34	2554	48 51 36	2573	47 12 4	2583	45 32 59	2612
	Sun E.	105 54 9	2855	104 20 53	2875	102 48 2	2894	101 15 35	2913
26	Saturn W.	103 47 38	2646	105 25 31	2669	107 3 2	2678	108 40 11	2694
	$\alpha$ Aquilæ W.	92 7 33	3433	93 29 12	3459	94 50 30	3471	96 11 26	3492
	Fomalhaut W.	59 28 11	2994	61 0 37	2903	62 32 52	2913	64 4 54	2923
	$\alpha$ Pegasi W.	44 25 53	3569	45 45 1	3537	47 4 44	3508	48 24 59	3483
	Aldebaran E.	37 24 15	2711	35 47 50	2739	34 11 53	2753	32 36 23	2774
	Sun E.	93 39 17	3005	92 9 10	3022	90 39 25	3039	89 10 1	3056
27	Saturn W.	116 40 49	2769	118 15 58	2783	119 50 48	2796	121 25 21	2810
	$\alpha$ Aquilæ W.	102 50 7	3606	104 8 35	3632	105 26 35	3658	106 44 7	3686
	Fomalhaut W.	71 42 0	2974	73 12 45	2985	74 43 17	2996	76 13 35	3006
	$\alpha$ Pegasi W.	55 11 53	3408	56 34 0	3400	57 56 16	3393	59 18 40	3388
	Aldebaran E.	24 46 7	2994	23 13 40	2922	21 41 49	2954	20 10 38	2969
	Sun E.	81 48 8	3138	80 20 44	3153	78 53 38	3168	77 26 50	3182
28	$\alpha$ Aquilæ W.	113 4 5	3840	114 18 26	3875	115 32 11	3911	116 45 20	3946
	Fomalhaut W.	83 41 47	3060	85 10 46	3089	86 39 33	3079	88 8 8	3090
	$\alpha$ Pegasi W.	66 11 51	3376	67 34 35	3377	68 57 18	3377	70 20 1	3379
	Sun E.	70 17 0	3349	68 51 49	3361	67 26 52	3373	66 2 9	3385
29	Fomalhaut W.	95 27 59	3138	96 55 22	3148	98 22 34	3157	99 49 35	3166
	$\alpha$ Pegasi W.	77 13 1	3392	78 35 27	3395	79 57 49	3399	81 20 7	3403
	$\alpha$ Arietis W.	33 36 5	3333	34 59 38	3315	36 23 32	3399	37 47 45	3366
	Sun E.	59 1 51	3338	57 38 23	3347	56 15 6	3357	54 52 0	3365
30	Fomalhaut W.	107 1 55	3210	108 27 52	3220	109 53 38	3229	111 19 13	3238
	$\alpha$ Pegasi W.	88 10 21	3427	89 32 7	3432	90 53 47	3438	92 15 21	3443
	$\alpha$ Arietis W.	44 52 5	3942	46 17 24	3936	47 42 50	3923	49 8 21	3928
	Sun E.	47 58 54	3405	46 36 43	3413	45 14 41	3420	43 52 47	3426
31	Fomalhaut W.	118 24 26	3285	119 48 55	3295	121 13 12	3306	122 37 17	3316
	$\alpha$ Pegasi W.	99 1 33	3474	100 22 26	3482	101 43 10	3489	103 3 46	3497
	$\alpha$ Arietis W.	56 16 59	3214	57 42 52	3210	59 8 48	3211	60 34 45	3208
	Aldebaran W.	24 59 34	3151	26 26 42	3144	27 53 58	3139	29 21 20	3134
	Sun E.	37 5 4	3457	35 43 52	3463	34 22 46	3463	33 1 47	3476

## AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S					Sidereal Time of the Semi-diameter passing the Meridian.	Equation of Time, to be added to subtracted from Apparent Time.	Diff. for 1 hour.
		Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Semi-diameter.			
Thur.	1	<sup>h</sup> 8 <sup>m</sup> 47 <sup>s</sup> 38.22	9.700	N. 17° 53' 46".9	38.17	15' 48".10	66.60	<sup>m</sup> 6 <sup>s</sup> 1.14	0.156
Frid.	2	8 51 30.73	9.676	17 38 21.7	38.91	15 48.23	66.52	5 57.10	0.180
Sat.	3	8 55 22.64	9.651	17 22 39.2	39.62	15 48.37	66.43	5 52.48	0.205
Sun.	4	8 59 13.95	9.626	17 6 39.9	40.32	15 48.51	66.34	5 47.25	0.230
Mon.	5	9 3 4.66	9.601	16 50 23.8	41.00	15 48.66	66.25	5 41.42	0.255
Tues.	6	9 6 54.77	9.576	16 33 51.3	41.67	15 48.81	66.17	5 34.98	0.280
Wed.	7	9 10 44.28	9.550	16 17 2.9	42.34	15 48.96	66.08	5 27.96	0.305
Thur.	8	9 14 33.19	9.525	15 59 58.7	43.00	15 49.12	66.00	5 20.33	0.330
Frid.	9	9 18 21.50	9.500	15 42 39.0	43.64	15 49.27	65.91	5 12.11	0.355
Sat.	10	9 22 9.23	9.476	15 25 4.3	44.26	15 49.44	65.83	5 3.36	0.379
Sun.	11	9 25 56.36	9.452	15 7 14.8	44.87	15 49.61	65.75	4 53.91	0.403
Mon.	12	9 29 42.90	9.428	14 49 10.8	45.46	15 49.79	65.67	4 43.94	0.427
Tues.	13	9 33 28.88	9.405	14 30 52.8	46.04	15 49.97	65.59	4 33.39	0.450
Wed.	14	9 37 14.30	9.382	14 12 21.0	46.61	15 50.16	65.51	4 22.28	0.473
Thur.	15	9 40 59.17	9.359	13 53 35.7	47.16	15 50.34	65.43	4 10.63	0.496
Frid.	16	9 44 43.50	9.336	13 34 37.2	47.72	15 50.53	65.36	3 58.44	0.519
Sat.	17	9 48 27.31	9.315	13 15 25.8	48.23	15 50.72	65.28	3 45.73	0.540
Sun.	18	9 52 10.61	9.294	12 56 1.9	48.74	15 50.91	65.21	3 32.51	0.561
Mon.	19	9 55 53.42	9.274	12 36 25.8	49.25	15 51.10	65.14	3 18.80	0.581
Tues.	20	9 59 35.76	9.254	12 16 37.7	49.75	15 51.30	65.07	3 4.61	0.601
Wed.	21	10 3 17.63	9.235	11 56 37.9	50.22	15 51.49	65.00	2 49.96	0.620
Thur.	22	10 6 59.04	9.216	11 36 26.8	50.69	15 51.69	64.93	2 34.86	0.638
Frid.	23	10 10 40.02	9.198	11 16 4.6	51.15	15 51.89	64.87	2 19.33	0.656
Sat.	24	10 14 20.59	9.181	10 55 31.6	51.59	15 52.10	64.81	2 3.38	0.673
Sun.	25	10 18 0.77	9.165	10 34 48.0	52.02	15 52.31	64.75	1 47.04	0.689
Mon.	26	10 21 40.57	9.149	10 13 54.4	52.44	15 52.52	64.70	1 30.33	0.705
Tues.	27	10 25 20.00	9.134	9 52 50.9	52.85	15 52.72	64.64	1 13.26	0.720
Wed.	28	10 28 59.06	9.120	9 31 37.8	53.24	15 52.94	64.59	0 55.83	0.734
Thur.	29	10 32 37.80	9.107	9 10 15.4	53.61	15 53.16	64.54	0 38.05	0.747
Frid.	30	10 36 16.22	9.094	8 48 44.2	53.98	15 53.38	64.49	0 19.97	0.760
Sat.	31	10 39 54.32	9.081	8 27 4.3	54.33	15 53.60	64.44	0 1.56	0.773
Sun.	32	10 43 32.12	9.068	N. 8 5 16.2	54.66	15 53.83	64.39	0 17.14	0.786

NOTE.—Mean Time of the Semidiameter passing may be found by subtracting 0s.18 from the Sidereal Time.

## AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time, to be subtracted from added to Mean Time.	Diff. for 1 hour.	Sidereal Time or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.			
Thur.	1	8 <sup>h</sup> 47 <sup>m</sup> 37.25 <sup>s</sup>	9.700	N. 17° 53' 50.8"	38.17	6 <sup>m</sup> 1.16 <sup>s</sup>	0.156	8 <sup>h</sup> 41 <sup>m</sup> 36.09 <sup>s</sup>
Frid.	2	8 51 29.77	9.676	17 38 25.6	38.91	5 57.12	0.180	8 45 32.65
Sat.	3	8 55 21.70	9.651	17 22 43.1	39.62	5 52.50	0.205	8 49 29.20
Sun.	4	8 59 13.02	9.626	17 6 43.8	40.32	5 47.26	0.230	8 53 25.76
Mon.	5	9 3 3.75	9.601	16 50 27.7	41.00	5 41.44	0.255	8 57 22.31
Tues.	6	9 6 53.88	9.576	16 33 55.2	41.67	5 35.01	0.280	9 1 18.87
Wed.	7	9 10 43.41	9.551	16 17 6.8	42.34	5 27.98	0.305	9 5 15.43
Thur.	8	9 14 32.34	9.526	16 0 2.6	43.00	5 20.35	0.330	9 9 11.99
Frid.	9	9 18 20.68	9.501	15 42 42.8	43.64	5 12.14	0.355	9 13 8.54
Sat.	10	9 22 8.43	9.477	15 25 8.0	44.26	5 3.33	0.379	9 17 5.10
Sun.	11	9 25 55.59	9.453	15 7 18.4	44.87	4 53.94	0.403	9 21 1.65
Mon.	12	9 29 42.16	9.429	14 49 14.3	45.46	4 43.96	0.427	9 24 58.20
Tues.	13	9 33 28.17	9.406	14 30 56.2	46.04	4 33.41	0.450	9 28 54.76
Wed.	14	9 37 13.62	9.383	14 12 24.3	46.61	4 22.30	0.473	9 32 51.32
Thur.	15	9 40 58.52	9.360	13 53 39.0	47.16	4 10.65	0.496	9 36 47.87
Frid.	16	9 44 42.89	9.337	13 34 40.4	47.72	3 58.46	0.519	9 40 44.43
Sat.	17	9 48 26.73	9.316	13 15 28.8	48.24	3 45.75	0.540	9 44 40.98
Sun.	18	9 52 10.07	9.295	12 56 4.8	48.75	3 32.53	0.561	9 48 37.54
Mon.	19	9 55 52.92	9.275	12 36 28.6	49.25	3 18.83	0.581	9 52 34.09
Tues.	20	9 59 35.29	9.255	12 16 40.3	49.76	3 4.64	0.601	9 56 30.65
Wed.	21	10 3 17.19	9.236	11 56 40.2	50.23	2 49.99	0.620	10 0 27.20
Thur.	22	10 6 58.64	9.218	11 36 28.9	50.70	2 34.88	0.638	10 4 23.76
Frid.	23	10 10 39.66	9.200	11 16 6.5	51.16	2 19.35	0.656	10 8 20.31
Sat.	24	10 14 20.27	9.183	10 55 33.3	51.60	2 3.40	0.673	10 12 16.87
Sun.	25	10 18 0.49	9.167	10 34 49.6	52.03	1 47.07	0.689	10 16 13.42
Mon.	26	10 21 40.33	9.151	10 13 55.7	52.45	1 30.35	0.705	10 20 9.98
Tues.	27	10 25 19.81	9.136	9 52 52.0	52.86	1 13.28	0.720	10 24 6.53
Wed.	28	10 28 58.92	9.123	9 31 38.6	53.25	0 55.84	0.734	10 28 3.08
Thur.	29	10 32 37.70	9.109	9 10 16.0	53.62	0 38.06	0.747	10 31 59.64
Frid.	30	10 36 16.16	9.096	8 48 44.5	53.99	0 19.97	0.760	10 35 56.19
Sat.	31	10 39 54.31	9.083	8 27 4.3	54.34	0 1.56	0.773	10 39 52.75
Sun.	32	10 43 32.16	9.070	N. 8 5 16.0	54.67	0 17.14	0.786	10 43 49.30

NOTE.—The Semidiameter for Mean Noon may be assumed the same as that for Apparent Noon.

Diff. for 1 hour  
+9°.8565



AT GREENWICH MEAN NOON.									
Day of the Month.	Day of the Year.	THE SUN'S				Logarithm of the Radius Vector of the Earth.	Diff. for 1 hour.	Mean Time of Sidereal Oh.	
		True LONGITUDE.		Diff. for 1 hour.	LATITUDE.				
		$\lambda$	$\lambda'$						
1	214	129° 28' 6.6	27° 52.1	143.63	+0.21	0.0063193	-24.0	<sup>h</sup> 15 <sup>m</sup> 15 <sup>s</sup> 53.45	
2	215	130 25 34.5	25 19.9	143.68	0.32	.0062604	25.0	15 11 57.55	
3	216	131 23 3.5	22 48.7	143.72	0.41	.0061992	26.0	15 8 1.62	
4	217	132 20 33.5	20 18.6	143.77	0.47	.0061355	27.0	15 4 5.71	
5	218	133 18 4.6	17 49.5	143.81	0.52	.0060694	28.0	15 0 9.80	
6	219	134 15 36.7	15 21.5	143.85	0.53	.0060010	28.9	14 56 13.89	
7	220	135 13 9.7	12 54.3	143.89	0.50	.0059304	29.8	14 52 17.98	
8	221	136 10 43.5	10 28.0	143.93	0.46	.0058576	30.7	14 48 22.07	
9	222	137 8 18.3	8 2.6	143.97	0.38	.0057826	31.6	14 44 26.16	
10	223	138 5 54.1	5 38.3	144.01	0.29	.0057056	32.4	14 40 30.25	
11	224	139 3 30.9	3 14.9	144.05	0.16	.0056269	33.1	14 36 34.35	
12	225	140 1 8.6	0 52.5	144.09	+0.03	.0055465	33.8	14 32 38.44	
13	226	140 58 47.2	58 30.9	144.13	-0.10	.0054646	34.4	14 28 42.53	
14	227	141 56 26.8	56 10.4	144.17	0.24	.0053813	34.9	14 24 46.62	
15	228	142 54 7.4	53 50.8	144.22	0.35	.0052968	35.4	14 20 50.70	
16	229	143 51 49.2	51 32.6	144.27	0.45	.0052112	35.8	14 16 54.79	
17	230	144 49 32.2	49 15.4	144.32	0.54	.0051247	36.3	14 12 58.88	
18	231	145 47 16.5	46 59.7	144.38	0.59	.0050372	36.7	14 9 2.97	
19	232	146 45 2.3	44 45.4	144.44	0.60	.0049488	37.0	14 5 7.07	
20	233	147 42 49.3	42 32.2	144.50	0.60	.0048595	37.4	14 1 11.16	
21	234	148 40 37.8	40 20.6	144.56	0.57	.0047693	37.7	13 57 15.25	
22	235	149 38 28.0	38 10.6	144.63	0.50	.0046782	38.1	13 53 19.34	
23	236	150 36 20.0	36 2.5	144.70	0.41	.0045862	38.5	13 49 23.43	
24	237	151 34 13.6	33 55.9	144.77	0.29	.0044932	39.0	13 45 27.52	
25	238	152 32 9.0	31 51.1	144.84	0.15	.0043991	39.4	13 41 31.61	
26	239	153 30 6.2	29 48.3	144.92	-0.02	.0043039	39.9	13 37 35.70	
27	240	154 28 5.3	27 47.2	145.00	+0.11	.0042074	40.4	13 33 39.80	
28	241	155 26 6.3	25 48.2	145.08	0.25	.0041094	41.0	13 29 43.89	
29	242	156 24 9.2	23 50.9	145.16	0.36	.0040099	41.6	13 25 47.98	
30	243	157 22 14.0	21 55.6	145.24	0.45	.0039090	42.3	13 21 52.07	
31	244	158 20 20.6	20 2.0	145.32	0.53	.0038065	43.0	13 17 56.17	
32	245	159 18 29.0	18 10.4	145.39	+0.58	0.0037023	-43.7	13 14 0.26	
NOTE: $\lambda$ corresponds to the true equinox of the date, $\lambda'$ to the mean equinox of January 0d.								Diff. for 1 hour -9°.8296	

## GREENWICH MEAN TIME.

## THE MOON'S

Day of the Month.	SEMI- DIAMETER.		HORIZONTAL PARALLAX.				MERIDIAN PASSAGE.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 hour.	Midnight.	Diff. for 1 hour.		Diff. for 1 hour.	
							<sup>h</sup> <sup>m</sup>	<sup>m</sup>	
1	14' 45.8	14' 44.7	54' 4.2	-0.41	54' 0.1	-0.25	22 38.9	2.07	26.7
2	14 44.0	14 43.8	53 57.7	-0.14	53 56.7	-0.02	23 28.2	2.02	27.7
3	14 43.9	14 44.4	53 57.1	+0.09	53 58.9	+0.21	δ		28.7
4	14 45.2	14 46.4	54 2.0	0.31	54 6.4	0.42	0 15.9	1.95	0.1
5	14 48.0	14 49.9	54 12.1	0.53	54 19.1	0.63	1 1.6	1.87	1.1
6	14 52.1	14 54.7	54 27.4	0.75	54 37.0	0.86	1 45.5	1.80	2.1
7	14 57.7	15 1.1	54 48.0	0.98	55 0.5	1.10	2 28.1	1.76	3.1
8	15 4.9	15 9.1	55 14.4	1.22	55 29.9	1.35	3 10.1	1.75	4.1
9	15 13.8	15 18.9	55 46.9	1.48	56 5.3	1.60	3 52.4	1.79	5.1
10	15 24.2	15 30.0	56 25.2	1.72	56 46.5	1.83	4 36.2	1.88	6.1
11	15 36.1	15 42.6	57 9.1	1.93	57 32.7	2.01	5 23.5	2.01	7.1
12	15 49.2	15 56.0	57 57.2	2.06	58 22.2	2.09	6 12.7	2.19	8.1
13	16 2.8	16 9.7	58 47.3	2.09	59 12.2	2.05	7 7.6	2.39	9.1
14	16 16.2	16 22.4	59 36.2	1.95	59 58.8	1.80	8 7.3	2.57	10.1
15	16 27.9	16 32.8	60 19.3	1.60	60 37.1	1.35	9 10.7	2.68	11.1
16	16 36.7	16 39.6	60 51.6	1.06	61 2.3	+0.72	10 15.4	2.67	12.1
17	16 41.4	16 41.9	61 8.7	+0.35	61 10.5	-0.04	11 18.7	2.55	13.1
18	16 41.1	16 39.0	61 7.7	-0.43	61 0.1	0.82	12 18.4	2.40	14.1
19	16 35.8	16 31.3	60 48.1	1.18	60 31.8	1.51	13 13.8	2.23	15.1
20	16 25.9	16 19.7	60 11.9	1.80	59 48.9	2.03	14 5.5	2.09	16.1
21	16 12.7	16 5.3	59 23.4	2.20	58 56.2	2.32	14 54.5	2.00	17.1
22	15 57.6	15 49.8	58 27.9	2.38	57 59.3	2.39	15 41.9	1.96	18.1
23	15 42.1	15 34.5	57 30.8	2.35	57 3.1	2.26	16 29.0	1.96	19.1
24	15 27.3	15 20.5	56 36.6	2.15	56 11.7	2.00	17 16.4	1.99	20.1
25	15 14.2	15 8.5	55 48.6	1.84	55 27.6	1.66	18 4.7	2.04	21.1
26	15 3.4	14 58.9	55 8.8	1.47	54 52.4	1.37	18 54.1	2.08	22.1
27	14 55.1	14 51.9	54 38.3	1.07	54 26.6	0.88	19 44.4	2.10	23.1
28	14 49.3	14 47.4	54 17.2	0.68	54 10.1	0.50	20 34.7	2.09	24.1
29	14 46.1	14 45.4	54 5.3	-0.31	54 2.6	-0.14	21 24.4	2.04	25.1
30	14 45.2	14 45.5	54 1.9	+0.02	54 3.0	+0.17	22 12.6	1.97	26.1
31	14 46.3	14 47.5	54 5.8	0.30	54 10.3	0.43	22 59.1	1.90	27.1
32	14 49.1	14 51.0	54 16.1	+0.54	54 23.3	+0.65	23 43.9	1.83	28.1

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
THURSDAY 1.					SATURDAY 3.				
0	6 34 48.65	2.1881	N.25 30 39.7	0.561	0	8 18 42.79	2.1905	N.23 39 27.4	5.091
1	6 36 59.94	2.1881	25 31 9.7	0.440	1	8 20 49.94	2.1179	23 34 18.7	5.190
2	6 39 11.23	2.1880	25 31 32.4	0.318	2	8 22 56.93	2.1153	23 29 3.6	5.305
3	6 41 22.51	2.1879	25 31 47.9	0.197	3	8 25 3.76	2.1125	23 23 42.1	5.413
4	6 43 33.78	2.1876	25 31 56.1	+0.075	4	8 27 10.43	2.1098	23 18 14.1	5.520
5	6 45 45.03	2.1872	25 31 56.9	-0.049	5	8 29 16.94	2.1071	23 12 39.7	5.628
6	6 47 56.25	2.1868	25 31 50.3	0.171	6	8 31 23.28	2.1043	23 6 58.8	5.735
7	6 50 7.45	2.1864	25 31 36.4	0.293	7	8 33 29.46	2.1016	23 1 11.6	5.839
8	6 52 18.62	2.1860	25 31 15.2	0.413	8	8 35 35.47	2.0989	22 55 18.2	5.943
9	6 54 29.77	2.1855	25 30 46.8	0.534	9	8 37 41.32	2.0961	22 49 18.5	6.048
10	6 56 40.88	2.1848	25 30 11.1	0.657	10	8 39 47.00	2.0932	22 43 12.5	6.152
11	6 58 51.95	2.1840	25 29 28.0	0.779	11	8 41 52.50	2.0903	22 37 0.3	6.254
12	7 1 2.97	2.1833	25 28 37.6	0.902	12	8 43 57.82	2.0879	22 30 42.0	6.356
13	7 3 13.95	2.1826	25 27 39.8	1.023	13	8 46 2.97	2.0843	22 24 17.6	6.458
14	7 5 24.88	2.1817	25 26 34.8	1.143	14	8 48 7.94	2.0815	22 17 47.1	6.560
15	7 7 35.75	2.1807	25 25 22.7	1.263	15	8 50 12.75	2.0787	22 11 10.4	6.662
16	7 9 46.56	2.1797	25 24 3.3	1.384	16	8 52 17.38	2.0758	22 4 27.7	6.761
17	7 11 57.31	2.1787	25 22 36.6	1.506	17	8 54 21.82	2.0725	21 57 39.1	6.859
18	7 14 8.01	2.1777	25 21 2.6	1.627	18	8 56 26.07	2.0694	21 50 44.6	6.958
19	7 16 18.64	2.1765	25 19 21.4	1.747	19	8 58 30.15	2.0664	21 43 44.2	7.056
20	7 18 29.19	2.1753	25 17 33.0	1.866	20	9 0 34.04	2.0634	21 36 37.9	7.154
21	7 20 39.67	2.1741	25 15 37.5	1.985	21	9 2 37.76	2.0604	21 29 25.7	7.252
22	7 22 50.07	2.1727	25 13 34.8	2.105	22	9 4 41.29	2.0574	21 22 7.7	7.347
23	7 25 0.39	2.1713	N.25 11 24.9	2.226	23	9 6 44.64	2.0542	N.21 14 44.1	7.441
FRIDAY 2.					SUNDAY 4.				
0	7 27 10.62	2.1699	N.25 9 7.7	2.346	0	9 8 47.80	2.0512	N.21 7 14.8	7.536
1	7 29 20.77	2.1684	25 6 43.4	2.464	1	9 10 50.78	2.0481	20 59 39.8	7.630
2	7 31 30.82	2.1668	25 4 12.1	2.580	2	9 12 53.57	2.0450	20 51 59.2	7.725
3	7 33 40.78	2.1652	25 1 33.8	2.698	3	9 14 56.17	2.0419	20 44 12.9	7.818
4	7 35 50.64	2.1635	24 58 48.4	2.814	4	9 16 58.59	2.0387	20 36 21.1	7.908
5	7 38 0.40	2.1618	24 55 55.9	2.935	5	9 19 0.82	2.0355	20 28 23.9	7.999
6	7 40 10.06	2.1600	24 52 56.2	3.054	6	9 21 2.86	2.0325	20 20 21.2	8.090
7	7 42 19.61	2.1582	24 49 49.5	3.170	7	9 23 4.72	2.0294	20 12 13.1	8.180
8	7 44 29.05	2.1563	24 46 35.9	3.284	8	9 25 6.39	2.0262	20 3 59.6	8.269
9	7 46 38.37	2.1543	24 43 15.5	3.399	9	9 27 7.87	2.0232	19 55 40.8	8.358
10	7 48 47.57	2.1524	24 39 48.1	3.515	10	9 29 9.17	2.0201	19 47 16.7	8.445
11	7 50 56.66	2.1506	24 36 13.7	3.632	11	9 31 10.28	2.0170	19 38 47.4	8.533
12	7 53 5.64	2.1487	24 32 32.3	3.749	12	9 33 11.21	2.0139	19 30 12.8	8.620
13	7 55 14.49	2.1468	24 28 43.9	3.862	13	9 35 11.95	2.0107	19 21 33.0	8.705
14	7 57 23.21	2.1442	24 24 48.8	3.974	14	9 37 12.50	2.0077	19 12 48.2	8.790
15	7 59 31.79	2.1420	24 20 47.0	4.087	15	9 39 12.87	2.0046	19 3 58.3	8.874
16	8 1 40.25	2.1398	24 16 38.4	4.200	16	9 41 13.05	2.0015	18 55 3.4	8.957
17	8 3 48.57	2.1374	24 12 23.0	4.315	17	9 43 13.05	1.9986	18 46 3.5	9.040
18	8 5 56.74	2.1350	24 8 0.7	4.428	18	9 45 12.87	1.9954	18 36 58.6	9.123
19	8 8 4.78	2.1329	24 3 31.7	4.538	19	9 47 12.50	1.9924	18 27 48.8	9.203
20	8 10 12.68	2.1304	23 58 56.1	4.648	20	9 49 11.95	1.9894	18 18 34.2	9.283
21	8 12 20.43	2.1279	23 54 13.9	4.758	21	9 51 11.23	1.9865	18 9 14.8	9.363
22	8 14 28.03	2.1254	23 49 25.1	4.869	22	9 53 10.33	1.9834	17 59 50.6	9.443
23	8 16 35.48	2.1230	23 44 29.6	4.981	23	9 55 9.24	1.9804	17 50 21.7	9.521
24	8 18 42.79	2.1205	N.23 39 27.4	5.091	24	9 57 7.97	1.9773	N.17 40 48.1	9.599

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
MONDAY 5.					WEDNESDAY 7.				
0	9 <sup>h</sup> 57 <sup>m</sup> 7.97	1.9773	N. 17° 40' 48.1"	9.599	0	11 <sup>h</sup> 29 <sup>m</sup> 10.89	1.8798	N. 8° 44' 55.7"	12.442
1	9 59 6.52	1.9745	17 31 9.9	9.675	1	11 31 3.22	1.8716	8 32 28.0	12.482
2	10 1 4.90	1.9716	17 21 27.1	9.752	2	11 32 55.48	1.8705	8 19 57.9	12.522
3	10 3 3.11	1.9687	17 11 39.7	9.828	3	11 34 47.68	1.8695	8 7 25.4	12.562
4	10 5 1.14	1.9658	17 1 47.8	9.902	4	11 36 39.82	1.8686	7 54 50.5	12.600
5	10 6 59.00	1.9629	16 51 51.5	9.975	5	11 38 31.91	1.8678	7 42 13.4	12.638
6	10 8 56.69	1.9600	16 41 50.8	10.049	6	11 40 23.95	1.8670	7 29 34.0	12.675
7	10 10 54.21	1.9573	16 31 45.7	10.121	7	11 42 15.94	1.8662	7 16 52.4	12.711
8	10 12 51.56	1.9545	16 21 36.3	10.193	8	11 44 7.89	1.8654	7 4 8.7	12.747
9	10 14 48.75	1.9517	16 11 22.6	10.263	9	11 45 59.79	1.8647	6 51 22.8	12.783
10	10 16 45.77	1.9491	16 1 4.7	10.333	10	11 47 51.66	1.8642	6 33 34.8	12.816
11	10 18 42.63	1.9463	15 50 42.6	10.403	11	11 49 43.50	1.8637	6 25 44.9	12.850
12	10 20 39.32	1.9436	15 40 16.4	10.471	12	11 51 35.30	1.8631	6 12 52.9	12.884
13	10 22 35.86	1.9410	15 29 46.1	10.539	13	11 53 27.08	1.8628	5 59 58.9	12.915
14	10 24 32.24	1.9383	15 19 11.8	10.606	14	11 55 18.84	1.8624	5 47 3.1	12.944
15	10 26 28.46	1.9356	15 8 33.4	10.673	15	11 57 10.57	1.8620	5 34 5.6	12.973
16	10 28 24.52	1.9331	14 57 51.1	10.738	16	11 59 2.28	1.8617	5 21 6.3	13.004
17	10 30 20.43	1.9307	14 47 4.9	10.804	17	12 0 53.98	1.8617	5 8 5.1	13.035
18	10 32 16.20	1.9283	14 36 14.7	10.869	18	12 2 45.69	1.8617	4 55 2.1	13.064
19	10 34 11.82	1.9257	14 25 20.7	10.931	19	12 4 37.39	1.8616	4 41 57.4	13.091
20	10 36 7.29	1.9233	14 14 23.0	10.993	20	12 6 29.09	1.8616	4 28 51.2	13.115
21	10 38 2.61	1.9209	14 3 21.6	11.054	21	12 8 20.78	1.8616	4 15 43.6	13.140
22	10 39 57.79	1.9189	13 52 16.5	11.116	22	12 10 12.48	1.8618	4 2 34.4	13.166
23	10 41 52.83	1.9165	N. 13 41 7.7	11.177	23	12 12 4.20	1.8620	N. 3 49 23.7	13.192
TUESDAY 6.					THURSDAY 8.				
0	10 43 47.74	1.9140	N. 13 29 55.3	11.236	0	12 13 55.93	1.8623	N. 3 36 11.4	13.219
1	10 45 42.51	1.9117	13 18 39.4	11.294	1	12 15 47.68	1.8626	3 22 57.7	13.238
2	10 47 37.15	1.9095	13 7 20.0	11.353	2	12 17 39.45	1.8630	3 9 42.8	13.258
3	10 49 31.66	1.9075	12 55 57.0	11.412	3	12 19 31.25	1.8636	2 56 26.7	13.279
4	10 51 26.04	1.9054	12 44 30.6	11.468	4	12 21 23.08	1.8641	2 43 9.3	13.300
5	10 53 20.30	1.9033	12 33 0.9	11.523	5	12 23 14.94	1.8648	2 29 50.7	13.321
6	10 55 14.43	1.9012	12 21 27.9	11.578	6	12 25 6.84	1.8654	2 16 30.8	13.341
7	10 57 8.44	1.8992	12 9 51.6	11.632	7	12 26 58.78	1.8661	2 3 9.8	13.359
8	10 59 2.33	1.8974	11 58 12.1	11.686	8	12 28 50.77	1.8670	1 49 47.8	13.375
9	11 0 56.12	1.8955	11 46 29.3	11.739	9	12 30 42.81	1.8678	1 36 24.9	13.390
10	11 2 49.79	1.8936	11 34 43.4	11.790	10	12 32 34.90	1.8687	1 23 1.0	13.407
11	11 4 43.35	1.8917	11 22 54.5	11.842	11	12 34 27.05	1.8698	1 9 36.1	13.423
12	11 6 36.79	1.8898	11 11 2.4	11.893	12	12 36 19.27	1.8709	0 56 10.3	13.437
13	11 8 30.13	1.8881	10 59 7.3	11.943	13	12 38 11.56	1.8721	0 42 43.7	13.450
14	11 10 23.37	1.8866	10 47 9.3	11.991	14	12 40 3.92	1.8732	0 29 16.3	13.463
15	11 12 16.52	1.8850	10 35 8.4	12.039	15	12 41 56.34	1.8744	0 15 48.2	13.474
16	11 14 9.57	1.8834	10 23 4.6	12.088	16	12 43 48.84	1.8757	N. 0 2 19.4	13.485
17	11 16 2.53	1.8819	10 10 57.9	12.135	17	12 45 41.43	1.8773	S. 0 11 10.0	13.496
18	11 17 55.39	1.8804	9 58 48.4	12.181	18	12 47 34.12	1.8789	0 24 40.1	13.506
19	11 19 48.17	1.8790	9 46 36.2	12.226	19	12 49 26.90	1.8804	0 38 10.7	13.514
20	11 21 40.87	1.8777	9 34 21.3	12.270	20	12 51 19.77	1.8821	0 51 41.7	13.521
21	11 23 33.49	1.8763	9 22 3.8	12.314	21	12 53 12.74	1.8837	1 5 13.2	13.529
22	11 25 26.03	1.8750	9 9 43.7	12.357	22	12 55 5.82	1.8855	1 18 45.1	13.535
23	11 27 18.49	1.8739	8 57 21.0	12.400	23	12 56 59.01	1.8874	1 32 17.3	13.539
24	11 29 10.89	1.8728	N. 8 44 55.7	12.442	24	12 58 52.31	1.8893	S. 1 45 49.7	13.543

## GREENWICH MEAN TIME

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
FRIDAY 9.					SUNDAY 11.				
0	12 58 52.31	1.8893	S. 1° 45' 49.7"	13.543	0	14 33 13.74	2.0718	S. 12° 23' 30.6"	12.639
1	13 0 45.73	1.8913	1 59 22.4	13.547	1	14 35 18.21	2.0773	12 36 7.6	12.563
2	13 2 39.27	1.8934	2 12 55.3	13.549	2	14 37 23.02	2.0831	12 48 41.8	12.546
3	13 4 32.94	1.8956	2 26 28.3	13.551	3	14 39 28.18	2.0889	13 1 13.1	12.497
4	13 6 26.74	1.8979	2 40 1.4	13.553	4	14 41 33.69	2.0946	13 13 41.5	12.448
5	13 8 20.68	1.9002	2 53 34.6	13.552	5	14 43 39.55	2.1007	13 26 6.9	12.397
6	13 10 14.76	1.9025	3 7 7.7	13.551	6	14 45 45.77	2.1067	13 38 29.2	12.345
7	13 12 8.98	1.9049	3 20 40.7	13.550	7	14 47 52.35	2.1137	13 50 48.3	12.291
8	13 14 3.35	1.9075	3 34 13.7	13.548	8	14 49 59.30	2.1190	14 3 4.2	12.238
9	13 15 57.88	1.9101	3 47 46.5	13.545	9	14 52 6.63	2.1253	14 15 16.9	12.183
10	13 17 52.57	1.9128	4 1 19.1	13.540	10	14 54 14.33	2.1314	14 27 26.2	12.125
11	13 19 47.42	1.9155	4 14 51.3	13.533	11	14 56 22.40	2.1377	14 39 31.9	12.068
12	13 21 42.43	1.9183	4 28 23.1	13.526	12	14 58 30.86	2.1443	14 51 34.1	12.007
13	13 23 37.61	1.9213	4 41 54.5	13.520	13	15 0 39.71	2.1507	15 3 32.7	11.945
14	13 25 32.98	1.9244	4 55 25.5	13.514	14	15 2 48.95	2.1573	15 15 27.5	11.881
15	13 27 28.53	1.9274	5 8 56.2	13.507	15	15 4 58.58	2.1638	15 27 18.5	11.817
16	13 29 24.27	1.9306	5 22 26.3	13.495	16	15 7 8.61	2.1706	15 39 5.6	11.752
17	13 31 20.20	1.9336	5 35 55.6	13.482	17	15 9 19.05	2.1773	15 50 48.8	11.686
18	13 33 16.31	1.9369	5 49 24.2	13.471	18	15 11 29.89	2.1840	16 2 27.9	11.617
19	13 35 12.63	1.9404	6 2 52.1	13.459	19	15 13 41.14	2.1909	16 14 2.8	11.547
20	13 37 9.16	1.9439	6 16 19.3	13.446	20	15 15 52.80	2.1979	16 25 33.5	11.476
21	13 39 5.89	1.9474	6 29 45.7	13.431	21	15 18 4.88	2.2048	16 36 59.9	11.403
22	13 41 2.84	1.9510	6 43 11.1	13.415	22	15 20 17.38	2.2118	16 48 21.9	11.328
23	13 43 0.01	1.9547	S. 6 56 35.5	13.399	23	15 22 30.30	2.2189	S. 16 59 39.3	11.252
SATURDAY 10.					MONDAY 12.				
0	13 44 57.40	1.9584	S. 7 9 59.0	13.382	0	15 24 43.64	2.2259	S. 17 10 52.2	11.176
1	13 46 55.02	1.9622	7 23 21.4	13.363	1	15 26 57.41	2.2329	17 22 0.4	11.097
2	13 48 52.87	1.9661	7 36 42.6	13.342	2	15 29 11.62	2.2404	17 33 3.8	11.016
3	13 50 50.95	1.9700	7 50 2.5	13.322	3	15 31 26.26	2.2476	17 44 2.3	10.933
4	13 52 49.27	1.9749	8 3 21.2	13.301	4	15 33 41.33	2.2548	17 54 55.8	10.850
5	13 54 47.85	1.9784	8 16 38.6	13.279	5	15 35 56.84	2.2622	18 5 44.3	10.765
6	13 56 46.68	1.9826	8 29 54.7	13.255	6	15 38 12.80	2.2697	18 16 27.6	10.677
7	13 58 45.76	1.9868	8 43 9.3	13.230	7	15 40 29.29	2.2771	18 27 5.6	10.589
8	14 0 45.10	1.9912	8 56 22.3	13.204	8	15 42 46.05	2.2845	18 37 38.3	10.501
9	14 2 44.71	1.9958	9 9 33.8	13.178	9	15 45 3.35	2.2921	18 48 5.7	10.411
10	14 4 44.59	2.0003	9 22 43.7	13.150	10	15 47 21.10	2.2996	18 58 27.6	10.316
11	14 6 44.74	2.0048	9 35 51.8	13.120	11	15 49 39.30	2.3072	19 8 43.7	10.220
12	14 8 45.17	2.0095	9 48 58.1	13.090	12	15 51 57.96	2.3148	19 18 54.0	10.123
13	14 10 45.88	2.0142	10 2 2.6	13.059	13	15 54 17.08	2.3225	19 28 58.5	10.026
14	14 12 46.88	2.0192	10 15 5.2	13.026	14	15 56 36.65	2.3300	19 38 57.1	9.927
15	14 14 48.18	2.0242	10 28 5.8	12.990	15	15 58 56.68	2.3376	19 48 49.8	9.827
16	14 16 49.78	2.0291	10 41 4.3	12.957	16	16 1 17.17	2.3454	19 58 36.4	9.723
17	14 18 51.67	2.0340	10 54 0.7	12.922	17	16 3 38.12	2.3531	20 8 16.6	9.617
18	14 20 53.86	2.0391	11 6 55.0	12.886	18	16 5 59.54	2.3606	20 17 50.5	9.511
19	14 22 56.37	2.0445	11 19 47.0	12.847	19	16 8 21.42	2.3685	20 27 18.0	9.403
20	14 24 59.20	2.0498	11 32 36.6	12.808	20	16 10 43.76	2.3763	20 36 38.9	9.294
21	14 27 2.34	2.0550	11 45 23.9	12.767	21	16 13 6.57	2.3840	20 45 53.3	9.184
22	14 29 5.80	2.0605	11 58 8.7	12.725	22	16 15 29.85	2.3919	20 55 1.0	9.070
23	14 31 9.60	2.0662	12 10 50.9	12.682	23	16 17 53.59	2.3996	21 4 1.8	8.955
24	14 33 13.74	2.0718	S. 12 23 30.6	12.639	24	16 20 17.79	2.4073	S. 21 12 55.6	8.838

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
TUESDAY 13.					THURSDAY 15.				
0	16 20 17.79	2.4073	S. 21° 12' 55.6"	8.838	0	18 23 58.29	2.7126	S. 25° 31' 58.0"	1.388
1	16 22 42.46	2.4151	21 21 44.4	8.781	1	18 26 41.16	2.7169	25 33 15.7	1.301
2	16 25 7.60	2.4229	21 30 24.1	8.692	2	18 29 24.24	2.7198	25 34 22.1	1.012
3	16 27 33.20	2.4305	21 38 56.6	8.480	3	18 32 7.53	2.7231	25 35 17.2	0.824
4	16 29 59.26	2.4382	21 47 21.7	8.355	4	18 34 51.01	2.7261	25 36 1.0	0.636
5	16 32 25.79	2.4460	21 55 39.3	8.231	5	18 37 34.66	2.7298	25 36 33.5	0.447
6	16 34 52.78	2.4537	22 3 49.5	8.106	6	18 40 18.47	2.7316	25 36 54.6	0.258
7	16 37 20.23	2.4613	22 11 52.0	7.977	7	18 43 2.45	2.7341	25 37 4.3	-0.068
8	16 39 48.14	2.4690	22 19 46.7	7.846	8	18 45 46.57	2.7365	25 37 2.5	+0.196
9	16 42 16.51	2.4765	22 27 33.5	7.719	9	18 48 30.83	2.7387	25 36 49.2	0.318
10	16 44 45.32	2.4840	22 35 12.4	7.579	10	18 51 15.21	2.7406	25 36 24.4	0.510
11	16 47 14.60	2.4918	22 42 43.2	7.446	11	18 53 59.70	2.7425	25 35 48.0	0.703
12	16 49 44.33	2.4993	22 50 4.0	7.311	12	18 56 44.31	2.7443	25 35 0.1	0.894
13	16 52 14.51	2.5067	22 57 18.5	7.172	13	18 59 29.01	2.7456	25 34 0.7	1.088
14	16 54 45.13	2.5141	23 4 24.6	7.031	14	19 2 13.78	2.7469	25 32 49.6	1.283
15	16 57 16.20	2.5215	23 11 22.2	6.888	15	19 4 58.63	2.7480	25 31 26.8	1.477
16	16 59 47.71	2.5287	23 18 11.2	6.745	16	19 7 43.54	2.7489	25 29 52.4	1.669
17	17 2 19.65	2.5359	23 24 51.6	6.601	17	19 10 28.49	2.7496	25 28 6.5	1.860
18	17 4 52.02	2.5431	23 31 23.4	6.456	18	19 13 13.49	2.7503	25 26 9.0	2.055
19	17 7 24.82	2.5503	23 37 46.4	6.307	19	19 15 58.52	2.7505	25 23 59.9	2.250
20	17 9 58.05	2.5575	23 44 0.3	6.155	20	19 18 43.55	2.7506	25 21 39.1	2.445
21	17 12 31.71	2.5644	23 50 5.0	6.001	21	19 21 26.59	2.7506	25 19 6.5	2.640
22	17 15 5.78	2.5713	23 56 0.5	5.849	22	19 24 13.62	2.7503	25 16 22.3	2.833
23	17 17 40.26	2.5780	S. 24 1 46.9	5.697	23	19 26 58.63	2.7501	S. 25 13 26.6	3.023
WEDNESDAY 14.					FRIDAY 16.				
0	17 20 15.14	2.5847	S. 24 7 24.3	5.544	0	19 29 43.63	2.7497	S. 25 10 19.5	3.215
1	17 22 50.43	2.5915	24 12 52.3	5.385	1	19 32 28.59	2.7489	25 7 0.8	3.410
2	17 25 26.12	2.5981	24 18 10.5	5.221	2	19 35 13.49	2.7478	25 3 30.4	3.605
3	17 28 2.20	2.6045	24 23 18.9	5.060	3	19 37 58.32	2.7466	24 59 48.3	3.798
4	17 30 38.66	2.6108	24 28 17.8	4.899	4	19 40 43.08	2.7454	24 55 54.7	3.988
5	17 33 15.50	2.6172	24 33 6.9	4.737	5	19 43 27.76	2.7440	24 51 49.8	4.176
6	17 35 52.72	2.6235	24 37 46.3	4.573	6	19 46 12.36	2.7424	24 47 33.6	4.365
7	17 38 30.31	2.6295	24 42 15.6	4.405	7	19 48 56.85	2.7405	24 43 6.0	4.557
8	17 41 8.26	2.6354	24 46 34.9	4.237	8	19 51 41.22	2.7386	24 38 26.8	4.748
9	17 43 46.56	2.6412	24 50 44.1	4.068	9	19 54 25.48	2.7365	24 33 36.2	4.937
10	17 46 25.21	2.6471	24 54 43.1	3.897	10	19 57 9.60	2.7340	24 28 34.4	5.123
11	17 49 4.20	2.6526	24 58 31.8	3.726	11	19 59 53.57	2.7315	24 23 21.5	5.309
12	17 51 43.52	2.6581	25 2 10.2	3.552	12	20 2 37.38	2.7288	24 17 57.3	5.497
13	17 54 23.17	2.6634	25 5 38.1	3.377	13	20 5 21.03	2.7261	24 12 21.9	5.682
14	17 57 3.13	2.6685	25 8 55.5	3.203	14	20 8 4.51	2.7233	24 6 35.5	5.864
15	17 59 43.39	2.6737	25 12 2.5	3.028	15	20 10 47.82	2.7209	24 0 38.2	6.047
16	18 2 23.96	2.6786	25 14 58.9	2.849	16	20 13 30.93	2.7168	23 54 29.9	6.230
17	18 5 4.82	2.6834	25 17 44.4	2.668	17	20 16 13.83	2.7133	23 48 10.6	6.413
18	18 7 45.97	2.6880	25 20 19.1	2.488	18	20 18 56.53	2.7098	23 41 40.4	6.593
19	18 10 27.39	2.6925	25 22 43.0	2.307	19	20 21 39.01	2.7061	23 34 59.4	6.772
20	18 13 9.07	2.6970	25 24 56.0	2.126	20	20 24 21.26	2.7023	23 28 7.8	6.948
21	18 15 51.02	2.7012	25 26 58.1	1.943	21	20 27 3.29	2.6986	23 21 5.7	7.124
22	18 18 33.22	2.7052	25 28 49.2	1.758	22	20 29 45.06	2.6943	23 13 53.0	7.300
23	18 21 15.64	2.7089	25 30 29.1	1.573	23	20 32 26.60	2.6897	23 6 29.8	7.475
24	18 23 58.29	2.7126	S. 25 31 58.0	1.388	24	20 35 7.85	2.6853	S. 22 58 56.1	7.648

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SATURDAY 17.					MONDAY 19.				
0	<sup>h</sup> 20 <sup>m</sup> 35 <sup>s</sup> 7.85	2.6853	S. 22° 58' 56.1"	7.648	0	<sup>h</sup> 22 <sup>m</sup> 37 <sup>s</sup> 23.84	2.3934	S. 14° 5' 48.4"	13.815
1	20 37 48.84	2.6809	22 51 12.1	7.818	1	22 39 47.25	2.3870	13 51 57.1	13.894
2	20 40 29.56	2.6763	22 43 18.0	7.987	2	22 42 10.28	2.3806	13 38 1.2	13.971
3	20 43 10.01	2.6718	22 35 13.7	8.156	3	22 44 32.92	2.3742	13 24 0.6	14.046
4	20 45 50.17	2.6669	22 26 59.3	8.323	4	22 46 55.18	2.3679	13 9 55.7	14.117
5	20 48 30.03	2.6617	22 18 35.0	8.488	5	22 49 17.06	2.3615	12 55 46.6	14.188
6	20 51 9.58	2.6566	22 10 0.8	8.652	6	22 51 38.56	2.3553	12 41 33.2	14.257
7	20 53 48.82	2.6514	22 1 16.8	8.813	7	22 53 59.69	2.3492	12 27 15.8	14.322
8	20 56 27.75	2.6464	21 52 23.2	8.973	8	22 56 20.45	2.3429	12 12 54.6	14.386
9	20 59 6.38	2.6410	21 43 20.0	9.133	9	22 58 40.84	2.3367	11 58 29.5	14.449
10	21 1 44.67	2.6353	21 34 7.3	9.290	10	23 1 0.86	2.3307	11 44 0.7	14.509
11	21 4 22.62	2.6297	21 24 45.3	9.445	11	23 3 20.52	2.3247	11 29 28.5	14.565
12	21 7 0.24	2.6241	21 15 13.9	9.600	12	23 5 39.82	2.3187	11 14 52.9	14.621
13	21 9 37.52	2.6184	21 5 33.3	9.751	13	23 7 58.76	2.3127	11 0 14.0	14.675
14	21 12 14.45	2.6125	20 55 43.8	9.899	14	23 10 17.35	2.3069	10 45 31.9	14.729
15	21 14 51.03	2.6067	20 45 45.4	10.047	15	23 12 35.58	2.3011	10 30 46.6	14.779
16	21 17 27.25	2.6007	20 35 38.2	10.194	16	23 14 53.46	2.2952	10 15 58.4	14.826
17	21 20 3.11	2.5948	20 25 22.2	10.340	17	23 17 11.00	2.2895	10 1 7.5	14.872
18	21 22 38.62	2.5887	20 14 57.4	10.484	18	23 19 28.21	2.2840	9 46 13.8	14.917
19	21 25 13.76	2.5826	20 4 24.1	10.624	19	23 21 45.08	2.2783	9 31 17.5	14.958
20	21 27 48.53	2.5763	19 53 42.6	10.760	20	23 24 1.61	2.2727	9 16 18.8	14.998
21	21 30 22.92	2.5700	19 42 52.9	10.896	21	23 26 17.80	2.2672	9 1 17.8	15.035
22	21 32 56.93	2.5637	19 31 55.1	11.032	22	23 28 33.67	2.2618	8 46 14.6	15.072
23	21 35 30.56	2.5575	S. 19° 20' 49.1"	11.168	23	23 30 49.22	2.2566	S. 8° 31' 9.2"	15.109
SUNDAY 18.					TUESDAY 20.				
0	21 38 3.82	2.5511	S. 19° 9' 35.0"	11.298	0	23 33 4.46	2.2513	S. 8° 16' 1.6"	15.143
1	21 40 36.69	2.5446	18 58 13.4	11.428	1	23 35 19.38	2.2461	8 0 52.1	15.172
2	21 43 9.17	2.5380	18 46 44.1	11.553	2	23 37 33.99	2.2410	7 45 41.0	15.199
3	21 45 41.26	2.5316	18 35 7.0	11.680	3	23 39 48.30	2.2359	7 30 28.3	15.225
4	21 48 12.96	2.5251	18 23 22.5	11.801	4	23 42 2.30	2.2308	7 15 14.0	15.252
5	21 50 44.27	2.5185	18 11 30.9	11.919	5	23 44 16.00	2.2259	6 59 58.1	15.277
6	21 53 15.18	2.5118	17 59 32.2	12.038	6	23 46 29.41	2.2211	6 44 40.8	15.298
7	21 55 45.69	2.5053	17 47 26.4	12.155	7	23 48 42.53	2.2162	6 29 22.3	15.318
8	21 58 15.81	2.4989	17 35 13.6	12.272	8	23 50 55.36	2.2115	6 14 2.7	15.335
9	22 0 45.55	2.4924	17 22 53.8	12.384	9	23 53 7.91	2.2069	5 58 42.1	15.351
10	22 3 14.89	2.4855	17 10 27.5	12.493	10	23 55 20.18	2.2022	5 43 20.6	15.366
11	22 5 43.82	2.4788	16 57 54.7	12.602	11	23 57 32.18	2.1977	5 27 58.2	15.381
12	22 8 12.35	2.4723	16 45 15.3	12.710	12	23 59 43.90	2.1932	5 12 35.0	15.393
13	22 10 40.49	2.4657	16 32 29.6	12.819	13	0 1 55.36	2.1888	4 57 11.2	15.401
14	22 13 8.23	2.4589	16 19 37.9	12.913	14	0 4 6.56	2.1845	4 41 46.9	15.409
15	22 15 35.56	2.4522	16 6 40.1	13.013	15	0 6 17.50	2.1803	4 26 22.2	15.415
16	22 18 2.50	2.4458	15 53 36.4	13.110	16	0 8 28.19	2.1761	4 10 57.2	15.419
17	22 20 29.05	2.4391	15 40 26.9	13.207	17	0 10 38.63	2.1721	3 55 32.0	15.423
18	22 22 55.20	2.4326	15 27 11.6	13.301	18	0 12 48.83	2.1680	3 40 6.5	15.425
19	22 25 20.96	2.4260	15 13 50.8	13.391	19	0 14 58.79	2.1641	3 24 41.0	15.424
20	22 27 46.32	2.4194	15 0 24.7	13.480	20	0 17 8.52	2.1602	3 9 15.6	15.421
21	22 30 11.28	2.4127	14 46 53.2	13.569	21	0 19 18.02	2.1564	2 53 50.4	15.417
22	22 32 35.85	2.4063	14 33 16.5	13.653	22	0 21 27.29	2.1527	2 38 25.5	15.413
23	22 35 0.04	2.3999	14 19 34.9	13.734	23	0 23 36.34	2.1491	2 23 0.9	15.408
24	22 37 23.84	2.3934	S. 14° 5' 48.4"	13.815	24	0 25 45.17	2.1454	S. 2° 7' 36.5"	15.403

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
WEDNESDAY 21.					FRIDAY 23.				
0	<sup>h</sup> 25 <sup>m</sup> 45.17	2.1454	S. <sup>°</sup> 7 <sup>'</sup> 36.5	15.409	0	<sup>h</sup> 2 <sup>m</sup> 6 <sup>s</sup> 1.78	2.0598	N. 9 <sup>°</sup> 37 <sup>'</sup> 15.2	13.523
1	0 27 53.79	2.1430	1 52 12.6	15.391	1	2 8 5.36	2.0595	9 50 44.6	13.456
2	0 30 2.21	2.1386	1 36 49.5	15.378	2	2 10 8.93	2.0593	10 4 10.0	13.390
3	0 32 10.42	2.1351	1 21 27.2	15.365	3	2 12 12.48	2.0592	10 17 31.5	13.324
4	0 34 18.43	2.1330	1 6 5.7	15.353	4	2 14 16.04	2.0594	10 30 48.9	13.256
5	0 36 26.25	2.1388	0 50 44.9	15.340	5	2 16 19.61	2.0595	10 44 2.2	13.187
6	0 38 33.89	2.1357	0 35 25.0	15.329	6	2 18 23.18	2.0595	10 57 11.3	13.117
7	0 40 41.34	2.1297	0 20 6.2	15.303	7	2 20 26.76	2.0597	11 10 16.2	13.047
8	0 42 48.61	2.1197	S. 0 4 48.6	15.283	8	2 22 30.35	2.0600	11 23 16.9	12.977
9	0 44 55.70	2.1168	N. 0 10 27.8	15.269	9	2 24 33.96	2.0603	11 36 13.4	12.905
10	0 47 2.62	2.1140	0 25 42.9	15.240	10	2 26 37.59	2.0607	11 49 5.5	12.830
11	0 49 9.38	2.1112	0 40 56.6	15.217	11	2 28 41.24	2.0609	12 1 53.1	12.756
12	0 51 15.97	2.1086	0 56 9.0	15.194	12	2 30 44.90	2.0612	12 14 36.3	12.682
13	0 53 22.41	2.1060	1 11 19.9	15.167	13	2 32 48.59	2.0618	12 27 15.0	12.607
14	0 55 28.69	2.1034	1 26 29.1	15.138	14	2 34 52.32	2.0625	12 39 49.2	12.531
15	0 57 34.82	2.1010	1 41 36.5	15.108	15	2 36 56.09	2.0630	12 52 18.8	12.454
16	0 59 40.81	2.0988	1 56 42.1	15.079	16	2 38 59.89	2.0637	13 4 43.7	12.376
17	1 1 46.66	2.0964	2 11 46.0	15.050	17	2 41 3.73	2.0642	13 17 3.9	12.298
18	1 3 52.38	2.0943	2 26 48.1	15.018	18	2 43 7.60	2.0649	13 29 19.5	12.220
19	1 5 57.97	2.0921	2 41 48.2	14.989	19	2 45 11.52	2.0658	13 41 30.3	12.139
20	1 8 3.43	2.0899	2 56 46.0	14.946	20	2 47 15.49	2.0667	13 53 36.2	12.058
21	1 10 8.76	2.0878	3 11 41.6	14.910	21	2 49 19.52	2.0676	14 5 37.3	11.977
22	1 12 13.97	2.0859	3 26 35.2	14.873	22	2 51 23.60	2.0684	14 17 33.5	11.895
23	1 14 19.07	2.0841	N. 3 41 26.5	14.835	23	2 53 27.73	2.0692	N. 14 29 24.7	11.811
THURSDAY 22.					SATURDAY 24.				
0	1 16 24.07	2.0825	N. 3 56 15.4	14.795	0	2 55 31.90	2.0701	N. 14 41 10.9	11.798
1	1 18 28.96	2.0807	4 11 1.9	14.754	1	2 57 36.14	2.0719	14 52 52.1	11.744
2	1 20 33.75	2.0789	4 25 45.9	14.713	2	2 59 40.44	2.0734	15 4 26.2	11.559
3	1 22 38.43	2.0773	4 40 27.5	14.671	3	3 1 44.82	2.0736	15 15 59.2	11.473
4	1 24 43.02	2.0759	4 55 6.5	14.626	4	3 3 49.26	2.0746	15 27 25.0	11.386
5	1 26 47.53	2.0746	5 9 42.7	14.579	5	3 5 53.77	2.0757	15 38 45.6	11.299
6	1 28 51.96	2.0733	5 24 16.0	14.531	6	3 7 58.35	2.0769	15 50 0.9	11.211
7	1 30 56.31	2.0718	5 38 46.5	14.485	7	3 10 3.00	2.0782	16 1 10.9	11.122
8	1 33 0.57	2.0704	5 53 14.2	14.438	8	3 12 7.73	2.0794	16 12 15.6	11.035
9	1 35 4.76	2.0694	6 7 39.1	14.390	9	3 14 12.53	2.0807	16 23 15.1	10.946
10	1 37 8.89	2.0684	6 22 1.0	14.338	10	3 16 17.41	2.0821	16 34 9.1	10.854
11	1 39 12.96	2.0674	6 36 19.7	14.285	11	3 18 22.37	2.0834	16 44 57.6	10.761
12	1 41 16.97	2.0662	6 50 35.1	14.231	12	3 20 27.42	2.0848	16 55 40.5	10.669
13	1 43 20.91	2.0654	7 4 47.4	14.178	13	3 22 32.55	2.0861	17 6 17.9	10.577
14	1 45 24.81	2.0645	7 18 56.5	14.124	14	3 24 37.76	2.0875	17 16 49.8	10.486
15	1 47 28.66	2.0638	7 33 2.3	14.068	15	3 26 43.06	2.0891	17 27 16.2	10.392
16	1 49 32.47	2.0631	7 47 4.7	14.011	16	3 28 48.45	2.0906	17 37 36.9	10.296
17	1 51 36.24	2.0625	8 1 3.6	13.953	17	3 30 53.93	2.0922	17 47 51.8	10.201
18	1 53 39.97	2.0619	8 14 59.1	13.896	18	3 32 59.51	2.0938	17 58 1.1	10.107
19	1 55 43.67	2.0614	8 28 51.1	13.836	19	3 35 5.18	2.0953	18 8 4.7	10.011
20	1 57 47.34	2.0608	8 42 39.4	13.773	20	3 37 10.94	2.0968	18 18 2.4	9.912
21	1 59 50.97	2.0603	8 56 23.9	13.711	21	3 39 16.79	2.0984	18 27 54.2	9.814
22	2 1 54.58	2.0600	9 10 4.7	13.649	22	3 41 22.74	2.1000	18 37 40.1	9.716
23	2 3 58.18	2.0600	9 23 41.8	13.587	23	3 43 28.79	2.1017	18 47 20.2	9.620
24	2 6 1.78	2.0598	N. 9 37 15.2	13.523	24	3 45 34.94	2.1033	N. 18 56 54.6	9.523



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SUNDAY 25.					TUESDAY 27.				
0	3 45 34.94	2.1033	N.18° 56' 54.6"	9.523	0	5 28 29.26	2.1798	N.24° 29' 56.1"	4.190
1	3 47 41.19	2.1050	19 6 23.0	9.429	1	5 30 40.08	2.1809	24 34 3.9	4.070
2	3 49 47.54	2.1067	19 15 45.2	9.319	2	5 32 50.97	2.1821	24 38 4.5	3.949
3	3 51 53.99	2.1083	19 25 1.3	9.217	3	5 35 1.93	2.1831	24 41 57.8	3.827
4	3 54 0.54	2.1100	19 34 11.3	9.117	4	5 37 12.94	2.1840	24 45 43.8	3.707
5	3 56 7.19	2.1117	19 43 15.3	9.017	5	5 39 24.01	2.1849	24 49 22.6	3.587
6	3 58 13.95	2.1135	19 52 13.3	8.915	6	5 41 35.13	2.1857	24 52 54.3	3.467
7	4 0 20.81	2.1153	20 1 5.1	8.810	7	5 43 46.30	2.1866	24 56 18.7	3.345
8	4 2 27.78	2.1170	20 9 50.6	8.705	8	5 45 57.52	2.1875	24 59 35.7	3.221
9	4 4 34.85	2.1187	20 18 29.8	8.600	9	5 48 8.80	2.1883	25 2 45.3	3.099
10	4 6 42.02	2.1204	20 27 2.7	8.496	10	5 50 20.12	2.1890	25 5 47.6	2.977
11	4 8 49.30	2.1224	20 35 29.4	8.393	11	5 52 31.48	2.1895	25 8 42.6	2.857
12	4 10 56.70	2.1242	20 43 49.9	8.288	12	5 54 42.87	2.1902	25 11 30.4	2.735
13	4 13 4.19	2.1257	20 52 4.0	8.181	13	5 56 54.30	2.1908	25 14 10.8	2.611
14	4 15 11.79	2.1275	21 0 11.6	8.073	14	5 59 5.77	2.1914	25 16 43.8	2.486
15	4 17 19.49	2.1292	21 8 12.8	7.968	15	6 1 17.27	2.1920	25 19 9.4	2.365
16	4 19 27.30	2.1311	21 16 7.6	7.859	16	6 3 28.80	2.1924	25 21 27.6	2.242
17	4 21 35.22	2.1329	21 23 55.9	7.750	17	6 5 40.35	2.1927	25 23 38.5	2.121
18	4 23 43.25	2.1346	21 31 37.6	7.640	18	6 7 51.92	2.1930	25 25 42.1	1.998
19	4 25 51.38	2.1363	21 39 12.7	7.531	19	6 10 3.51	2.1933	25 27 38.3	1.874
20	4 27 59.61	2.1380	21 46 41.3	7.423	20	6 12 15.11	2.1935	25 29 27.0	1.750
21	4 30 7.95	2.1399	21 54 3.5	7.314	21	6 14 26.73	2.1938	25 31 8.3	1.626
22	4 32 16.40	2.1417	22 1 19.0	7.209	22	6 16 38.36	2.1939	25 32 42.2	1.504
23	4 34 24.95	2.1434	N.22° 8' 27.8"	7.090	23	6 18 49.99	2.1939	N.25° 34' 8.8"	1.381
MONDAY 26.					WEDNESDAY 28.				
0	4 36 33.60	2.1450	N.22° 15' 29.8"	6.977	0	6 21 1.63	2.1940	N.25° 35' 28.0"	1.258
1	4 38 42.35	2.1467	22 22 25.1	6.867	1	6 23 13.27	2.1940	25 36 39.8	1.134
2	4 40 51.20	2.1485	22 30 13.8	6.756	2	6 25 24.91	2.1939	25 37 44.1	1.010
3	4 43 0.16	2.1502	22 35 55.8	6.643	3	6 27 36.54	2.1938	25 38 41.0	0.886
4	4 45 9.22	2.1517	22 42 31.0	6.529	4	6 29 48.16	2.1936	25 39 30.5	0.763
5	4 47 18.37	2.1533	22 48 59.3	6.415	5	6 31 59.77	2.1935	25 40 12.6	0.640
6	4 49 27.62	2.1550	22 55 20.8	6.301	6	6 34 11.38	2.1934	25 40 47.3	0.516
7	4 51 36.97	2.1566	23 1 35.5	6.187	7	6 36 22.97	2.1929	25 41 14.6	0.393
8	4 53 46.41	2.1581	23 7 43.3	6.072	8	6 38 34.53	2.1924	25 41 34.5	0.270
9	4 55 55.94	2.1596	23 13 44.2	5.957	9	6 40 46.05	2.1919	25 41 47.0	0.146
10	4 58 5.56	2.1611	23 19 38.2	5.841	10	6 42 57.55	2.1915	25 41 52.1	+0.025
11	5 0 15.28	2.1628	23 25 25.2	5.725	11	6 45 9.03	2.1911	25 41 50.0	-0.095
12	5 2 25.10	2.1642	23 31 5.4	5.610	12	6 47 20.48	2.1905	25 41 40.5	0.219
13	5 4 34.99	2.1657	23 36 38.5	5.493	13	6 49 31.89	2.1897	25 41 23.5	0.345
14	5 6 44.98	2.1672	23 42 4.6	5.376	14	6 51 43.25	2.1890	25 40 59.1	0.469
15	5 8 55.05	2.1686	23 47 23.7	5.259	15	6 53 54.57	2.1889	25 40 27.3	0.591
16	5 11 5.21	2.1700	23 52 35.7	5.141	16	6 56 5.84	2.1874	25 39 48.2	0.713
17	5 13 15.45	2.1713	23 57 40.6	5.024	17	6 58 17.06	2.1866	25 39 1.8	0.835
18	5 15 25.76	2.1726	24 2 38.6	4.907	18	7 0 28.23	2.1856	25 38 8.0	0.958
19	5 17 36.15	2.1739	24 7 29.5	4.788	19	7 2 39.34	2.1846	25 37 6.9	1.079
20	5 19 46.62	2.1753	24 12 13.2	4.667	20	7 4 50.39	2.1836	25 35 58.5	1.201
21	5 21 57.18	2.1766	24 16 49.6	4.547	21	7 7 1.38	2.1826	25 34 42.8	1.323
22	5 24 7.81	2.1777	24 21 18.9	4.429	22	7 9 12.30	2.1814	25 33 19.8	1.443
23	5 26 18.50	2.1787	24 25 41.1	4.310	23	7 11 23.15	2.1804	25 31 49.6	1.564
24	5 28 29.26	2.1798	N.24° 29' 56.1"	4.190	24	7 13 33.94	2.1792	N.25° 30' 12.1"	1.686

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
THURSDAY 29.					SATURDAY 31.				
0	<sup>h</sup> 7 <sup>m</sup> 13 <sup>s</sup> 33.94	2.1799	N.25° 30' 12.1"	1.898	0	<sup>h</sup> 8 <sup>m</sup> 55 <sup>s</sup> 54.39	2.0791	N.21° 56' 20.6"	7.069
1	7 15 44.65	2.1778	25 28 27.3	1.897	1	8 57 58.62	2.0690	21 49 14.5	7.151
2	7 17 55.28	2.1764	25 26 35.3	1.898	2	9 0 2.67	2.0660	21 42 2.5	7.949
3	7 20 5.82	2.1750	25 24 36.0	2.048	3	9 2 6.54	2.0630	21 34 44.6	7.348
4	7 22 16.28	2.1738	25 22 29.5	2.168	4	9 4 10.24	2.0601	21 37 20.8	7.445
5	7 24 26.66	2.1723	25 20 15.8	2.988	5	9 6 13.76	2.0579	21 19 51.2	7.549
6	7 26 36.95	2.1707	25 17 54.9	2.408	6	9 8 17.10	2.0549	21 12 15.8	7.639
7	7 28 47.14	2.1690	25 15 26.9	2.596	7	9 10 20.27	2.0513	21 4 34.6	7.735
8	7 30 57.23	2.1674	25 12 51.8	2.845	8	9 12 23.26	2.0484	20 56 47.6	7.831
9	7 33 7.23	2.1658	25 10 9.5	2.764	9	9 14 26.07	2.0454	20 48 54.9	7.994
10	7 35 17.12	2.1640	25 7 20.1	2.889	10	9 16 28.70	2.0424	20 40 56.7	8.017
11	7 37 26.91	2.1623	25 4 23.7	2.999	11	9 18 31.16	2.0395	20 32 52.9	8.109
12	7 39 36.60	2.1605	25 1 20.2	3.118	12	9 20 33.45	2.0366	20 24 43.6	8.201
13	7 41 46.18	2.1586	24 58 9.6	3.236	13	9 22 35.56	2.0336	20 16 28.8	8.293
14	7 43 55.64	2.1567	24 54 52.0	3.359	14	9 24 37.49	2.0306	20 8 8.5	8.384
15	7 46 4.98	2.1547	24 51 27.4	3.480	15	9 26 39.23	2.0276	19 59 42.7	8.475
16	7 48 14.20	2.1527	24 47 55.8	3.585	16	9 28 40.80	2.0248	19 51 11.5	8.565
17	7 50 23.30	2.1507	24 44 17.3	3.700	17	9 30 42.20	2.0219	19 42 34.9	8.654
18	7 52 32.29	2.1488	24 40 31.9	3.815	18	9 32 43.42	2.0189	19 33 53.1	8.741
19	7 54 41.15	2.1468	24 36 39.6	3.930	19	9 34 44.46	2.0159	19 25 6.0	8.829
20	7 56 49.88	2.1444	24 32 40.4	4.045	20	9 36 45.33	2.0130	19 16 13.7	8.915
21	7 58 58.48	2.1423	24 28 34.3	4.160	21	9 38 46.02	2.0100	19 7 16.3	9.000
22	8 1 6.95	2.1400	24 24 21.3	4.274	22	9 40 46.53	2.0071	18 58 13.8	9.085
23	8 3 15.28	2.1377	N.24° 20' 1.5"	4.387	23	9 42 46.87	2.0042	N.18° 49' 6.2"	9.169
FRIDAY 30.					SUNDAY, SEPTEMBER 1.				
0	8 5 23.48	2.1355	N.24° 15' 34.9"	4.499	0	9 44 47.04	2.0013	N.18° 39' 53.6"	9.259
1	8 7 31.54	2.1332	24 11 1.6	4.612	PHASES OF THE MOON.				
2	8 9 39.46	2.1308	24 6 21.6	4.723					
3	8 11 47.23	2.1283	24 1 34.9	4.834					
4	8 13 54.85	2.1258	23 56 41.5	4.945					
5	8 16 2.33	2.1236	23 51 41.5	5.055	☉ New Moon, . . . <sup>d</sup> 3 <sup>h</sup> 21 <sup>m</sup> 45.7				
6	8 18 9.67	2.1211	23 46 34.9	5.165					
7	8 20 16.86	2.1185	23 41 21.7	5.275					
8	8 22 23.89	2.1158	23 36 1.9	5.384					
9	8 24 30.76	2.1131	23 30 35.6	5.493	☾ First Quarter, . . . 11° 17' 52.4"				
10	8 26 37.47	2.1105	23 25 2.8	5.601					
11	8 28 44.03	2.1089	23 19 23.5	5.709					
12	8 30 50.45	2.1054	23 13 37.8	5.814					
13	8 32 56.68	2.1029	23 7 45.8	5.920	☾ Full Moon, . . . 18° 8' 53.3"				
14	8 35 2.76	2.1000	23 1 47.4	6.026					
15	8 37 8.68	2.0973	22 55 42.7	6.131					
16	8 39 14.43	2.0944	22 49 31.7	6.236					
17	8 41 20.01	2.0917	22 43 14.4	6.341	☾ Apogee, . . . . . <sup>d</sup> 2 <sup>h</sup> 14.3				
18	8 43 25.43	2.0889	22 36 50.8	6.445					
19	8 45 30.68	2.0860	22 30 21.0	6.549					
20	8 47 35.76	2.0839	22 23 45.0	6.651					
21	8 49 40.67	2.0804	22 17 3.0	6.752	☾ Perigee, . . . . . 17° 10.7"				
22	8 51 45.41	2.0776	22 10 14.9	6.853					
23	8 53 49.98	2.0749	22 3 20.7	6.953					
24	8 55 54.39	2.0721	N.21° 56' 20.6"	7.059					

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
1	$\alpha$ Pegasi W.	104 24 14	3505	105 44 33	3514	107 4 42	3522	108 24 42	3532
	$\alpha$ Arietis W.	62 0 45	3207	63 26 46	3204	64 52 50	3203	66 18 56	3202
	Aldebaran W.	30 48 48	3131	32 16 20	3128	33 43 56	3125	35 11 35	3123
	SUN E.	31 40 56	3481	30 20 11	3488	28 59 34	3495	27 39 4	3503
6	SUN W.	23 34 50	3436	24 56 26	3422	26 18 18	3408	27 40 25	3396
	Spica E.	45 14 57	3041	43 45 35	3037	42 16 8	3034	40 46 38	3031
	Antares E.	91 3 21	3009	89 33 19	3004	88 3 11	2998	86 32 56	2993
7	SUN W.	34 34 12	3344	35 57 33	3333	37 21 6	3324	38 44 50	3313
	Spica E.	33 18 26	3094	31 48 43	3095	30 19 1	3095	28 49 19	3096
	Antares E.	78 59 50	2962	77 28 49	2955	75 57 40	2948	74 26 22	2940
	Saturn E.	116 24 3	2933	114 52 26	2926	113 20 40	2919	111 48 45	2911
	$\alpha$ Aquilæ E.	121 27 23	4073	120 16 55	4031	119 5 46	3991	117 53 58	3955
8	SUN W.	45 46 28	3263	47 11 23	3252	48 36 31	3242	50 1 51	3230
	Antares E.	66 47 29	2901	65 15 12	2894	63 42 45	2885	62 10 7	2878
	Saturn E.	104 6 41	2871	102 33 45	2862	101 0 37	2853	99 27 18	2844
	$\alpha$ Aquilæ E.	111 46 21	3797	110 31 16	3770	109 15 43	3744	107 59 42	3730
9	SUN W.	57 11 54	3173	58 38 36	3160	60 5 33	3148	61 32 44	3135
	Antares E.	54 24 4	2830	52 50 15	2820	51 16 13	2811	49 41 59	2800
	Saturn E.	91 37 37	2785	90 3 2	2783	88 26 12	2772	86 53 8	2761
	$\alpha$ Aquilæ E.	101 33 32	3612	100 15 11	3593	98 56 29	3576	97 37 28	3559
10	SUN W.	68 52 37	3069	70 21 25	3055	71 50 30	3040	73 19 53	3026
	Antares E.	41 47 25	2748	40 11 49	2738	38 35 59	2727	36 59 55	2717
	Saturn E.	78 54 1	2702	77 17 24	2689	75 40 30	2677	74 3 19	2663
	$\alpha$ Aquilæ E.	90 58 0	3485	89 37 19	3472	88 16 24	3461	86 55 16	3450
	Fomalhaut E.	123 53 26	2966	122 22 31	2945	120 51 9	2924	119 19 21	2903
11	SUN W.	80 51 22	2950	82 22 37	2935	83 54 12	2919	85 26 7	2902
	Spica W.	18 24 54	2818	19 58 59	2775	21 34 0	2736	23 9 52	2700
	Antares E.	28 56 22	2672	27 19 5	2666	25 41 39	2660	24 4 5	2656
	Saturn E.	65 52 53	2595	64 13 51	2581	62 34 30	2566	60 54 49	2552
	$\alpha$ Aquilæ E.	80 6 53	3408	78 44 46	3404	77 22 34	3400	76 0 17	3397
	Fomalhaut E.	111 33 51	2805	109 59 30	2787	108 24 45	2768	106 49 35	2750
12	SUN W.	93 10 56	2890	94 44 58	2804	96 19 21	2787	97 54 6	2769
	Spica W.	31 19 47	2564	32 59 32	2541	34 39 48	2520	36 20 34	2499
	Saturn E.	52 13 19	2477	50 49 34	2463	49 7 29	2448	47 25 2	2432
	$\alpha$ Aquilæ E.	69 8 37	3405	67 46 26	3412	66 24 23	3421	65 2 30	3433
	Fomalhaut E.	98 47 50	2661	97 10 18	2645	95 32 24	2629	93 54 7	2612
	$\alpha$ Pegasi E.	116 12 48	2993	114 42 27	2963	113 11 28	2935	111 39 53	2908
13	SUN W.	105 53 29	2685	107 30 29	2669	109 7 51	2652	110 45 36	2635
	Spica W.	44 51 33	2401	46 35 7	2392	48 19 7	2364	50 3 33	2347
	Saturn E.	38 47 25	2358	37 2 50	2344	35 17 55	2329	33 32 38	2316
	$\alpha$ Aquilæ E.	58 17 27	3535	56 57 42	3569	55 38 34	3607	54 20 7	3649
	Fomalhaut E.	85 37 10	2533	83 56 42	2518	82 15 54	2504	80 34 46	2489
	$\alpha$ Pegasi E.	103 53 46	2786	102 19 0	2765	100 43 46	2744	99 8 4	2725
14	SUN W.	118 59 51	2556	120 39 47	2541	122 20 3	2526	124 0 40	2512
	Spica W.	58 51 59	2263	60 38 53	2247	62 26 10	2231	64 13 51	2216
	Antares E.	13 25 23	2481	15 7 3	2462	16 50 7	2471	18 34 23	2488

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXh.	P. L. of Diff.
1	$\alpha$ Pegasi W.	109° 44' 31"	3549	111° 4' 9"	3559	112° 23' 36"	3563	113° 42' 51"	3574
	$\alpha$ Arietis W.	67 45 3	3200	69 11 12	3199	70 37 22	3198	72 3 34	3196
	Aldebaran W.	36 39 17	3121	38 7 1	3119	39 34 48	3117	41 2 37	3115
	Sun E.	26 18 43	3511	24 58 31	3519	23 38 28	3529	22 18 36	3540
6	Sun W.	29 2 46	3386	30 25 19	3375	31 48 4	3364	33 11 2	3353
	Spica E.	39 17 4	3029	37 47 27	3027	36 17 48	3026	34 48 7	3026
	Antares E.	85 2 34	2986	83 32 4	2981	82 1 27	2974	80 30 42	2969
7	Sun W.	40 8 46	3303	41 32 54	3294	42 57 13	3282	44 21 45	3273
	Spica E.	27 19 39	3029	25 50 2	3035	24 20 33	3044	22 51 15	3056
	Antares E.	72 54 54	2933	71 23 17	2926	69 51 31	2918	68 19 35	2910
	Saturn E.	110 16 40	2904	108 44 26	2895	107 12 1	2887	105 39 26	2880
	$\alpha$ Aquilæ E.	116 41 34	2920	115 28 35	2887	114 15 2	2856	113 0 57	2825
8	Sun W.	51 27 25	3219	52 53 12	3208	54 19 12	3196	55 45 26	3184
	Antares E.	60 37 18	2867	59 4 17	2859	57 31 5	2849	55 57 41	2839
	Saturn E.	97 53 47	2835	96 20 4	2825	94 46 8	2815	93 11 59	2805
	$\alpha$ Aquilæ E.	106 43 16	2896	105 26 25	2874	104 9 10	2852	102 51 32	2832
9	Sun W.	63 0 11	3122	64 27 54	3110	65 55 52	3096	67 24 6	3082
	Antares E.	48 7 31	2790	46 32 50	2779	44 57 55	2769	43 22 47	2759
	Saturn E.	85 17 49	2750	83 42 15	2738	82 6 26	2726	80 30 21	2715
	$\alpha$ Aquilæ E.	96 18 9	3543	94 58 32	3526	93 38 37	3512	92 18 26	3498
10	Sun W.	74 49 33	3011	76 19 32	2996	77 49 50	2981	79 20 26	2965
	Antares E.	35 23 38	2707	33 47 7	2698	32 10 24	2689	30 33 29	2680
	Saturn E.	72 25 50	2651	70 48 4	2637	69 9 59	2623	67 31 35	2610
	$\alpha$ Aquilæ E.	85 33 56	3440	84 12 25	3431	82 50 43	3423	81 28 52	3415
	Fomalhaut E.	117 47 6	2883	116 14 29	2863	114 41 19	2843	113 7 47	2825
11	Sun W.	86 58 23	2886	88 31 0	2870	90 3 57	2853	91 37 16	2837
	Spica W.	24 46 32	2689	26 23 54	2639	28 1 56	2612	29 40 34	2587
	Antares E.	22 26 26	2655	20 48 46	2659	19 11 11	2668	17 33 48	2684
	Saturn E.	59 14 48	2538	57 34 27	2522	55 53 45	2507	54 12 42	2493
	$\alpha$ Aquilæ E.	74 37 57	3395	73 15 35	3395	71 53 13	3397	70 30 53	3400
	Fomalhaut E.	105 14 2	2739	103 38 4	2714	102 1 43	2696	100 24 58	2679
12	Sun W.	99 29 14	2753	101 4 44	2735	102 40 37	2719	104 16 52	2702
	Spica W.	38 1 49	2478	39 43 33	2458	41 25 46	2438	43 8 26	2419
	Saturn E.	45 42 13	2417	43 59 3	2403	42 15 32	2388	40 31 40	2372
	$\alpha$ Aquilæ E.	63 40 51	3447	62 19 28	3464	60 58 24	3484	59 37 42	3508
	Fomalhaut E.	92 15 28	2595	90 36 26	2579	88 57 2	2564	87 17 17	2548
	$\alpha$ Pegasi E.	110 7 44	2682	108 35 2	2657	107 1 48	2632	105 28 2	2609
13	Sun W.	112 23 43	2618	114 2 13	2603	115 41 4	2587	117 20 17	2572
	Spica W.	51 48 24	2329	53 33 41	2312	55 19 23	2296	57 5 29	2279
	Saturn E.	31 47 2	2302	30 1 6	2290	28 14 52	2278	26 28 20	2267
	$\alpha$ Aquilæ E.	53 2 26	3699	51 45 38	3755	50 29 49	3818	49 15 5	3888
	Fomalhaut E.	78 53 18	2476	77 11 31	2463	75 29 26	2451	73 47 4	2439
	$\alpha$ Pegasi E.	97 31 57	2705	95 55 24	2687	94 18 26	2670	92 41 6	2653
14	Sun W.	125 41 36	2498	127 22 52	2485	129 4 27	2472	130 46 20	2460
	Spica W.	66 1 54	2202	67 50 19	2187	69 39 6	2174	71 28 13	2161
	Antares E.	20 19 42	2291	22 5 54	2259	23 52 54	2233	25 40 33	2209

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.		Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
14	Saturn	E.	24° 41' 32"	2257	22° 54' 29"	2249	21° 7' 14"	2243	19° 19' 51"	2241
	α Aquilæ	E.	48 1 33	3273	46 49 27	4066	45 38 52	4172	44 29 59	4225
	Fomalhaut	E.	72 4 25	2428	70 21 30	2418	68 38 21	2408	66 54 58	2400
	α Pegasi	E.	91 3 23	2638	89 25 19	2623	87 46 55	2610	86 8 14	2597
15	Spica	W.	73 17 40	2147	75 7 27	2135	76 57 33	2123	78 47 57	2111
	Antares	W.	27 28 47	2188	29 17 32	2170	31 6 45	2152	32 56 25	2136
	Fomalhaut	E.	58 15 29	2373	56 31 16	2372	54 47 1	2373	53 2 47	2375
	α Pegasi	E.	77 50 58	2552	76 10 57	2546	74 30 48	2543	72 50 34	2540
16	Spica	W.	88 4 3	2083	89 55 59	2055	91 48 7	2048	93 40 26	2042
	Antares	W.	42 10 16	2073	44 1 57	2062	45 53 54	2053	47 46 5	2046
	Fomalhaut	E.	44 23 41	2426	42 40 44	2447	40 58 16	2473	39 16 25	2504
	α Pegasi	E.	64 29 25	2556	62 49 30	2566	61 9 49	2580	59 30 26	2585
	α Arietis	E.	105 57 46	2157	104 8 14	2148	102 18 28	2139	100 28 29	2131
17	Spica	W.	103 4 7	2021	104 57 9	2019	106 50 14	2019	108 43 20	2017
	Antares	W.	57 9 40	2017	59 2 47	2015	60 55 58	2012	62 49 13	2011
	Saturn	W.	20 18 57	2033	22 11 39	2024	24 4 36	2016	25 57 45	2011
	α Pegasi	E.	51 20 13	2724	49 44 5	2764	48 8 50	2811	46 34 36	2863
	α Arietis	E.	91 15 58	2105	89 25 7	2103	87 34 13	2102	85 43 17	2101
18	Antares	W.	72 15 36	2016	74 8 45	2019	76 1 49	2023	77 54 47	2028
	α Aquilæ	W.	39 21 20	4227	40 20 34	4206	41 22 54	4412	42 28 4	4243
	Saturn	W.	35 24 48	2005	37 18 14	2007	39 11 37	2010	41 4 55	2015
	α Pegasi	E.	39 3 26	3261	37 38 29	3379	36 15 48	3515	34 55 41	3673
	α Arietis	E.	76 28 59	2115	74 38 23	2121	72 47 56	2128	70 57 39	2136
	Aldebaran	E.	106 52 5	2021	104 59 3	2024	103 6 6	2028	101 13 6	2033
19	Antares	W.	87 17 16	2065	89 9 9	2074	91 0 48	2084	92 52 12	2095
	Saturn	W.	50 29 21	2048	52 21 41	2057	54 13 47	2066	56 5 38	2077
	α Aquilæ	W.	48 28 23	3658	49 45 55	3579	51 4 52	3509	52 25 6	3449
	α Arietis	E.	61 49 49	2192	60 1 9	2207	58 12 52	2223	56 24 59	2241
	Aldebaran	E.	91 51 23	2070	89 59 37	2079	88 8 5	2089	86 16 49	2099
20	Antares	W.	102 4 43	2158	103 54 14	2172	105 43 23	2187	107 32 10	2203
	Saturn	W.	65 20 35	2137	67 10 37	2152	69 0 17	2167	70 49 35	2181
	α Aquilæ	W.	59 20 40	3246	60 45 55	3221	62 11 39	3201	63 37 47	3184
	α Arietis	E.	47 32 43	2350	45 47 57	2378	44 3 51	2408	42 20 27	2439
	Aldebaran	E.	77 4 56	2163	75 15 33	2178	73 26 32	2193	71 37 54	2208
21	Saturn	W.	79 50 17	2262	81 37 12	2280	83 23 41	2297	85 9 45	2315
	α Aquilæ	W.	70 52 13	3147	72 19 26	3146	73 46 40	3148	75 13 51	3152
	Fomalhaut	W.	36 4 18	2722	37 38 56	2770	39 14 3	2753	40 49 33	2739
	α Arietis	E.	33 56 9	2651	32 12 23	2707	30 41 53	2770	29 6 46	2843
	Aldebaran	E.	62 40 45	2224	60 54 36	2311	59 8 53	2331	57 23 38	2349
	Pollux	E.	106 45 51	2277	104 59 17	2294	103 13 8	2311	101 27 25	2328
	Mars	E.	116 35 17	2476	114 53 30	2494	113 12 9	2512	111 31 12	2531
22	Saturn	W.	93 53 30	2407	95 36 55	2425	97 19 54	2445	99 2 25	2463
	α Aquilæ	W.	82 27 48	3200	83 53 57	3213	85 19 51	3227	86 45 28	3244
	Fomalhaut	W.	48 49 53	2723	50 26 2	2727	52 2 6	2732	53 38 4	2738
	α Pegasi	W.	35 35 29	3856	36 49 33	3765	38 5 12	3682	39 22 18	3615
	Aldebaran	E.	48 44 18	2448	47 1 52	2469	45 19 55	2490	43 38 28	2512
	Pollux	E.	92 45 18	2420	91 2 12	2439	89 19 33	2458	87 37 21	2477

## GREENWICH MEAN TIME

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
14	Saturn E.	17° 32' 23"	2249	15° 44' 59"	2248	13° 57' 43"	2264	12° 10' 50"	2291
	α Aquilæ E.	43 23 2	4432	42 18 10	4590	41 15 37	4771	40 15 37	4979
	Fomalhaut E.	65 11 23	2392	63 27 37	2385	61 43 41	2380	59 59 38	2376
	α Pegasi E.	84 29 15	2585	82 50 0	2575	81 10 31	2566	79 30 50	2559
15	Spica W.	80 38 39	2101	82 29 37	2090	84 20 51	2081	86 12 20	2072
	Antares W.	34 46 29	2122	36 36 55	2107	38 27 43	2095	40 18 50	2083
	Fomalhaut E.	51 18 37	2380	49 34 34	2387	47 50 41	2397	46 7 2	2410
	α Pegasi E.	71 10 16	2540	69 29 58	2540	67 49 41	2544	66 9 29	2550
16	Spica W.	95 32 55	2036	97 25 33	2032	98 18 18	2027	100 11 10	2024
	Antares W.	49 38 28	2038	51 31 3	2032	53 23 47	2026	55 16 40	2022
	Fomalhaut E.	37 35 18	2542	35 55 3	2587	34 15 50	2641	32 37 51	2709
	α Pegasi E.	57 51 24	2613	56 12 47	2635	54 34 40	2660	52 57 7	2689
	α Arietis E.	98 38 17	2194	96 47 55	2118	94 57 23	2113	93 6 44	2109
17	Spica W.	110 36 27	2017	112 29 34	2019	114 22 37	2022	116 15 37	2025
	Antares W.	64 42 30	2010	66 35 48	2010	68 29 6	2014	70 22 22	2013
	Saturn W.	27 51 2	2007	29 44 25	2005	31 37 52	2004	33 31 20	2004
	α Pegasi E.	45 1 30	2992	43 29 39	2990	41 59 14	3068	40 30 25	3158
	α Arietis E.	83 52 20	2102	82 1 24	2104	80 10 31	2107	78 19 42	2111
18	Antares W.	79 47 37	2034	81 40 18	2041	83 32 49	2048	85 25 9	2056
	α Aquilæ W.	43 35 50	4005	44 45 57	3963	45 58 13	3848	47 12 26	3747
	Saturn W.	42 58 6	2019	44 51 10	2026	46 44 4	2032	48 36 48	2039
	α Pegasi E.	33 38 25	3856	32 24 21	4070	31 13 50	4321	30 7 17	4618
	α Arietis E.	69 7 35	2145	67 17 44	2155	65 28 8	2166	63 38 49	2178
	Aldebaran E.	99 20 33	2039	97 27 59	2045	95 35 35	2053	93 43 23	2061
19	Antares W.	94 43 19	2107	96 34 8	2118	98 24 39	2131	100 14 51	2144
	Saturn W.	57 57 13	2088	59 48 31	2099	61 39 31	2111	63 30 13	2124
	α Aquilæ W.	53 46 27	3397	55 8 47	3351	56 32 0	3310	57 56 0	3276
	α Arietis E.	54 37 32	2259	52 50 32	2280	51 4 3	2302	49 18 6	2325
	Aldebaran E.	84 25 49	2111	82 35 7	2124	80 44 44	2136	78 54 40	2149
20	Antares W.	109 20 33	2218	111 8 33	2235	112 56 8	2252	114 43 18	2268
	Saturn W.	72 38 31	2197	74 27 3	2212	76 15 12	2229	78 2 57	2245
	α Aquilæ W.	65 4 15	3170	66 31 0	3160	67 57 57	3153	69 25 2	3148
	α Arietis E.	40 37 48	2474	38 55 58	2512	37 15 2	2554	35 35 4	2600
	Aldebaran E.	69 49 39	2225	68 1 48	2241	66 14 22	2258	64 27 21	2275
	Saturn W.	86 55 23	2333	88 40 35	2351	90 25 20	2370	92 9 38	2388
21	α Aquilæ W.	76 40 58	3158	78 7 57	3166	79 34 47	3177	81 1 24	3188
	Fomalhaut W.	42 25 21	2729	44 1 22	2724	45 37 30	2722	47 13 41	2721
	α Arietis E.	27 33 14	2997	26 1 29	3023	24 31 45	3137	23 4 20	3271
	Aldebaran E.	55 38 50	2368	53 54 29	2388	52 10 37	2408	50 27 13	2428
	Pollux E.	99 42 7	2346	97 57 15	2365	96 12 50	2383	94 28 51	2401
	Mars E.	109 50 42	2549	108 10 37	2569	106 30 59	2588	104 51 47	2607
22	Saturn W.	100 44 30	2482	102 26 8	2501	104 7 20	2520	105 48 6	2538
	α Aquilæ W.	88 10 45	3292	89 35 41	3280	91 0 16	3300	92 24 28	3320
	Fomalhaut W.	55 13 53	2747	56 49 31	2756	58 24 57	2765	60 0 11	2775
	α Pegasi W.	40 40 36	3556	41 59 58	3506	43 20 15	2466	44 41 17	2430
	Aldebaran E.	41 57 31	2533	40 17 4	2555	38 37 7	2577	36 57 41	2600
	Polaris E.	85 55 35	2485	84 14 15	2514	82 33 21	2533	80 52 54	2551

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Diff.	III <sup>h</sup> .	P. L. of Diff.	VI <sup>h</sup> .	P. L. of Diff.	IX <sup>h</sup> .	P. L. of Diff.
22	Mars E.	103° 13' 2"	2626	101° 34' 43"	2646	99° 56' 51"	2666	98° 19' 25"	2686
	SUN E.	130 24 22	2757	128 48 58	2776	127 13 59	2796	125 39 24	2815
23	Saturn W.	107 28 26	2557	109 8 20	2575	110 47 49	2594	112 26 52	2613
	α Aquilæ W.	93 48 16	3342	95 11 39	3365	96 34 36	3388	97 57 6	3412
	Fomalhaut W.	61 35 11	2787	63 9 56	2799	64 44 25	2811	66 18 38	2825
	α Pegasi W.	46 3 0	3400	47 25 17	3373	48 48 4	3353	50 11 14	3337
	Aldebaran E.	35 18 46	2624	33 40 23	2647	32 2 32	2672	30 25 15	2698
	Pollux E.	79 12 52	2570	77 33 16	2588	75 54 5	2607	74 15 20	2625
	Mars E.	90 18 50	2783	88 44 0	2803	87 9 36	2822	85 35 37	2841
	SUN E.	117 52 50	2912	116 20 46	2931	114 49 6	2951	113 17 51	2970
24	α Aquilæ W.	104 42 20	3550	106 1 49	3580	107 20 45	3612	108 39 6	3646
	Fomalhaut W.	74 5 27	2892	75 37 56	2907	77 10 6	2920	78 41 59	2935
	α Pegasi W.	57 10 54	3291	58 35 16	3288	59 59 42	3286	61 24 10	3286
	Pollux E.	66 7 37	2713	64 31 15	2731	62 55 16	2747	61 19 39	2763
	Mars E.	77 51 44	2933	76 20 7	2951	74 48 53	2969	73 18 1	2985
	SUN E.	105 47 30	3062	104 18 34	3080	102 50 0	3098	101 21 48	3116
25	Fomalhaut W.	86 16 57	3005	87 47 4	3018	89 16 54	3032	90 46 27	3045
	α Pegasi W.	68 26 7	3300	69 50 19	3304	71 14 26	3309	72 38 27	3314
	α Arietis W.	24 56 1	3476	26 16 52	3483	27 38 42	3379	29 1 22	3345
	Pollux E.	53 26 47	2841	51 53 12	2855	50 19 56	2869	48 46 58	2884
	Mars E.	65 48 51	3066	64 20 0	3082	62 51 28	3096	61 23 14	3110
	SUN E.	94 5 56	3198	92 39 44	3213	91 13 50	3227	89 48 13	3242
26	Fomalhaut W.	98 10 8	3110	99 38 5	3123	101 5 47	3135	102 33 14	3148
	α Pegasi W.	79 36 44	3349	80 59 59	3356	82 23 6	3364	83 46 4	3372
	α Arietis W.	36 2 40	3245	37 27 56	3235	38 53 24	3227	40 19 1	3220
	Pollux E.	41 6 32	2949	39 35 15	2961	38 4 13	2972	36 33 25	2984
	Mars E.	54 6 13	3176	52 39 35	3188	51 13 12	3199	49 47 2	3210
	SUN E.	82 44 16	3308	81 20 14	3320	79 56 26	3332	78 32 52	3343
27	Fomalhaut W.	109 46 51	3207	111 12 52	3218	112 38 40	3231	114 4 13	3242
	α Pegasi W.	90 38 41	3411	92 0 45	3419	93 22 40	3427	94 44 26	3436
	α Arietis W.	47 28 36	3204	48 54 41	3203	50 20 47	3202	51 46 54	3200
	Aldebaran W.	16 15 37	3243	17 40 55	3218	19 6 43	3197	20 32 56	3180
	Pollux E.	29 2 58	3038	27 33 32	3049	26 4 20	3060	24 35 21	3072
	Mars E.	42 39 19	3259	41 14 20	3269	39 49 32	3277	38 24 54	3285
	SUN E.	71 38 1	3392	70 15 35	3400	68 53 19	3408	67 31 12	3416
28	α Pegasi W.	101 30 52	3479	102 51 40	3488	104 12 17	3497	105 32 44	3506
	α Arietis W.	58 57 42	3199	60 23 52	3199	61 50 2	3199	63 16 12	3199
	Aldebaran W.	27 47 38	3141	29 14 58	3138	30 42 22	3134	32 9 50	3133
	Mars E.	31 23 57	3391	30 0 10	3398	28 36 31	3335	27 13 0	3341
	SUN E.	60 42 36	3448	59 21 14	3453	57 59 57	3458	56 38 46	3462
29	α Pegasi W.	112 12 16	3559	113 31 35	3572	114 50 40	3584	116 9 32	3598
	α Arietis W.	70 27 9	3196	71 53 23	3195	73 19 38	3193	74 45 55	3193
	Aldebaran W.	39 27 44	3124	40 55 25	3122	42 23 8	3120	43 50 53	3118
	SUN E.	49 53 53	3479	48 33 5	3481	47 12 20	3483	45 51 37	3485
30	α Arietis W.	81 57 44	3183	83 24 13	3182	84 50 44	3179	86 17 17	3177
	Aldebaran W.	51 10 15	3107	52 38 16	3105	54 6 20	3101	55 34 28	3098
	SUN E.	39 8 27	3491	37 47 53	3493	36 27 21	3494	35 6 50	3495

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
22	Mars E.	96 42 26	9705	95 5 53	9725	93 29 46	9744	91 54 5	9764
	SUN E.	124 5 15	2834	122 31 31	2854	120 58 13	2873	119 25 29	2892
23	Saturn W.	114 5 21	2830	115 43 45	2849	117 21 34	2868	118 58 59	2884
	α Aquilæ W.	99 19 9	3438	100 40 42	3464	102 1 46	3492	103 22 19	3521
	Fomalhaut W.	67 52 34	2838	69 26 13	2851	70 59 35	2864	72 32 40	2878
	α Pegasi W.	51 34 43	3323	52 58 28	3311	54 22 27	3301	55 46 37	3295
	Aldebaran E.	28 48 32	2725	27 12 25	2753	25 36 56	2783	24 2 6	2814
	Pollux E.	72 36 59	2843	70 59 2	2861	69 21 30	2879	67 44 22	2896
	Mars E.	84 2 2	2880	82 28 52	2879	80 56 6	2897	79 23 43	2916
	SUN E.	111 47 0	2969	110 16 33	3008	108 46 30	3098	107 16 49	3043
24	α Aquilæ W.	109 56 51	3679	111 14 0	3715	112 30 31	3751	113 46 24	3790
	Fomalhaut W.	80 13 34	2949	81 44 51	2982	83 15 51	2977	84 46 33	2991
	α Pegasi W.	62 48 38	3080	64 13 4	3089	65 37 28	3092	67 1 49	3094
	Pollux E.	59 44 23	2780	58 9 29	2796	56 34 55	2811	55 0 41	2826
	Mars E.	71 47 30	3002	70 17 20	3018	68 47 30	3035	67 18 1	3051
	SUN E.	99 53 58	3133	98 26 28	3149	96 59 18	3165	95 32 27	3182
25	Fomalhaut W.	92 15 44	3058	93 44 44	3072	95 13 28	3085	96 41 56	3098
	α Pegasi W.	74 2 22	3391	75 26 9	3397	76 49 49	3334	78 13 21	3349
	α Arietis W.	30 24 42	3316	31 48 35	3322	33 12 56	3373	34 37 39	3358
	Pollux E.	47 14 19	2898	45 41 57	2912	44 9 53	2924	42 38 5	2936
	Mars E.	59 55 17	3194	58 27 37	3138	57 0 13	3151	55 33 5	3164
	SUN E.	88 22 54	3256	86 57 51	3270	85 33 4	3282	84 8 32	3296
26	Fomalhaut W.	104 0 26	3159	105 27 24	3172	106 54 7	3183	108 20 36	3195
	α Pegasi W.	85 8 53	3379	86 31 33	3386	87 54 5	3394	89 16 28	3403
	α Arietis W.	41 44 46	3215	43 10 37	3210	44 36 34	3208	46 2 34	3206
	Pollux E.	35 2 52	2995	33 32 33	3006	32 2 28	3017	30 32 36	3028
	Mars E.	48 21 5	3221	46 55 21	3231	45 29 49	3241	44 4 28	3251
	SUN E.	77 9 30	3354	75 46 21	3364	74 23 23	3374	73 0 37	3383
27	Fomalhaut W.	115 29 33	3253	116 54 39	3265	118 19 32	3276	119 44 11	3288
	α Pegasi W.	96 6 2	3444	97 27 29	3453	98 48 46	3461	100 9 54	3470
	α Arietis W.	53 13 3	3200	54 39 12	3199	56 5 22	3199	57 31 32	3199
	Aldebaran W.	21 59 29	3168	23 26 17	3158	24 53 16	3151	26 20 24	3146
	Pollux E.	23 6 37	3083	21 38 7	3096	20 9 53	3110	18 41 55	3124
	Mars E.	37 0 25	3283	35 36 5	3300	34 11 54	3307	32 47 51	3315
	SUN E.	66 9 14	3423	64 47 24	3430	63 25 41	3436	62 4 5	3442
28	α Pegasi W.	106 53 1	3516	108 13 7	3526	109 33 2	3537	110 52 45	3548
	α Arietis W.	64 42 22	3198	66 8 33	3198	67 34 44	3198	69 0 56	3197
	Aldebaran W.	33 37 20	3136	35 4 53	3129	36 32 28	3127	38 0 5	3125
	Mars E.	25 49 36	3348	24 26 20	3355	23 3 12	3362	21 40 12	3371
	SUN F.	55 17 39	3466	53 56 37	3470	52 35 39	3472	51 14 44	3476
29	α Pegasi W.	117 28 9	3611	118 46 31	3627	120 4 36	3642	121 22 25	3659
	α Arietis W.	76 12 13	3191	77 38 33	3190	79 4 54	3188	80 31 18	3186
	Aldebaran W.	45 18 41	3116	46 46 31	3114	48 14 23	3112	49 42 18	3110
	SUN E.	44 30 56	3486	43 10 16	3488	41 49 38	3489	40 29 2	3490
30	α Arietis W.	87 43 55	3174	89 10 35	3171	90 37 19	3168	92 4 6	3165
	Aldebaran W.	57 2 40	3096	58 30 55	3091	59 59 15	3087	61 27 46	3084
	SUN E.	33 46 20	3496	32 25 51	3497	31 5 24	3499	30 41 5	3501



## AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S						Sidereal Time of the Semi-diameter passing the Meridian.	Equation of Time, to be subtracted from Apparent Time.	Diff. for 1 hour.
		Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Semi-diameter.				
		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>	<sup>'</sup> <sup>"</sup> <sup>'''</sup>				
Sun.	1	10 43 32.12	9.068	N. 8° 5' 16.2	54.66	15' 53.83	64.39	<sup>m</sup> <sup>s</sup> <sup>s</sup>	<sup>s</sup>	
Mon.	2	10 47 9.64	9.057	7 43 20.3	54.98	15 54.06	64.35	0 17.14	0.786	
Tues.	3	10 50 46.89	9.046	7 21 16.9	55.30	15 54.30	64.31	0 36.11	0.797	
Wed.	4	10 54 23.89	9.036	6 59 6.2	55.59	15 54.54	64.27	0 55.36	0.808	
Thur.	5	10 58 0.64	9.027	6 36 48.8	55.87	15 54.79	64.24	1 14.87	0.818	
Frid.	6	11 1 37.16	9.018	6 14 24.7	56.14	15 55.04	64.21	1 34.62	0.827	
Sat.	7	11 5 13.47	9.009	5 51 54.5	56.38	15 55.29	64.18	1 54.59	0.836	
Sun.	8	11 8 49.59	9.002	5 29 18.5	56.61	15 55.54	64.15	2 14.78	0.845	
Mon.	9	11 12 25.53	8.994	5 6 37.0	56.84	15 55.79	64.12	2 35.15	0.852	
Tues.	10	11 16 1.31	8.988	4 43 50.5	57.04	15 56.05	64.10	2 55.71	0.860	
Wed.	11	11 19 36.95	8.983	4 20 59.2	57.22	15 56.31	64.08	3 16.43	0.866	
Thur.	12	11 23 12.47	8.978	3 58 3.4	57.41	15 56.57	64.07	3 37.29	0.871	
Frid.	13	11 26 47.89	8.973	3 35 3.6	57.57	15 56.83	64.06	3 58.27	0.876	
Sat.	14	11 30 23.23	8.971	3 11 59.9	57.72	15 57.09	64.06	4 19.34	0.881	
Sun.	15	11 33 58.52	8.969	2 48 52.7	57.86	15 57.36	64.06	4 40.49	0.883	
Mon.	16	11 37 33.77	8.969	2 25 42.4	57.99	15 57.62	64.06	5 1.71	0.885	
Tues.	17	11 41 9.02	8.969	2 2 29.3	58.10	15 57.89	64.06	5 22.95	0.885	
Wed.	18	11 44 44.28	8.970	1 39 13.7	58.20	15 58.15	64.06	5 44.20	0.885	
Thur.	19	11 48 19.58	8.971	1 15 55.8	58.28	15 58.42	64.07	6 5.42	0.884	
Frid.	20	11 51 54.95	8.975	0 52 36.0	58.36	15 58.68	64.08	6 26.62	0.883	
Sat.	21	11 55 30.41	8.979	0 29 14.6	58.41	15 58.95	64.10	6 47.77	0.879	
Sun.	22	11 59 5.97	8.985	N. 0 5 51.8	58.46	15 59.21	64.11	7 8.80	0.875	
Mon.	23	12 2 41.66	8.990	S. 0 17 32.0	58.49	15 59.48	64.13	7 29.73	0.869	
Tues.	24	12 6 17.50	8.997	0 40 56.4	58.51	15 59.74	64.14	7 50.53	0.864	
Wed.	25	12 9 53.52	9.005	0 40 56.4	58.51	15 59.74	64.14	8 11.17	0.857	
Thur.	26	12 13 29.74	9.014	1 4 21.0	58.52	16 0.01	64.17	8 31.66	0.849	
Frid.	27	12 17 6.17	9.023	1 27 45.6	58.52	16 0.28	64.20	8 51.94	0.840	
Sat.	28	12 20 42.84	9.033	1 51 9.9	58.49	16 0.55	64.23	9 12.01	0.831	
Sun.	29	12 24 19.75	9.043	2 14 33.4	58.44	16 0.82	64.26	9 31.85	0.821	
Mon.	30	12 27 56.94	9.055	2 37 55.9	58.39	16 1.09	64.30	9 51.43	0.811	
Tues.	31	12 31 34.42	9.067	3 1 16.9	58.33	16 1.36	64.34	10 10.74	0.799	
				S. 3 24 36.2	58.25	16 1.64	64.38	10 29.76	0.787	

NOTE.—Mean Time of the Semidiameter passing may be found by subtracting 0.18 from the Sidereal Time.

## AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time, to be added to Mean Time.	Diff. for 1 hour.	Sidereal Time or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.			
Sun.	1	<sup>h</sup> 10 <sup>m</sup> 43 <sup>s</sup> 32.16	9.070	N. 8° 5' 16.0"	54.67	<sup>m</sup> 0 <sup>s</sup> 17.14	0.786	<sup>h</sup> 10 <sup>m</sup> 43 <sup>s</sup> 49.30
Mon.	2	10 47 9.73	9.059	7 43 19.8	54.99	0 36.12	0.797	10 47 45.85
Tues.	3	10 50 47.03	9.048	7 21 16.0	55.31	0 55.38	0.808	10 51 42.41
Wed.	4	10 54 24.08	9.038	6 59 5.0	55.60	1 14.88	0.818	10 55 38.96
Thur.	5	10 58 0.88	9.029	6 36 47.3	55.88	1 34.63	0.827	10 59 35.51
Frid.	6	11 1 37.45	9.020	6 14 22.9	56.15	1 54.62	0.836	11 3 32.07
Sat.	7	11 5 13.81	9.011	5 51 52.4	56.39	2 14.81	0.845	11 7 28.62
Sun.	8	11 8 49.98	9.004	5 29 16.1	56.62	2 35.19	0.852	11 11 25.17
Mon.	9	11 12 25.96	8.996	5 6 34.3	56.85	2 55.76	0.860	11 15 21.72
Tues.	10	11 16 1.80	8.990	4 43 47.4	57.05	3 16.48	0.866	11 19 18.28
Wed.	11	11 19 37.50	8.985	4 20 55.7	57.24	3 37.34	0.871	11 23 14.84
Thur.	12	11 23 13.07	8.980	3 57 59.6	57.43	3 58.32	0.876	11 27 11.39
Frid.	13	11 26 48.54	8.975	3 34 50.4	57.59	4 19.40	0.881	11 31 7.94
Sat.	14	11 30 23.93	8.973	3 11 55.4	57.74	4 40.56	0.883	11 35 4.49
Sun.	15	11 33 59.27	8.971	2 48 47.9	57.88	5 1.78	0.885	11 39 1.05
Mon.	16	11 37 34.57	8.971	2 25 37.2	58.01	5 23.03	0.885	11 42 57.60
Tues.	17	11 41 9.87	8.971	2 2 23.8	58.12	5 44.28	0.885	11 46 54.15
Wed.	18	11 44 45.19	8.972	1 39 7.8	58.22	6 5.52	0.884	11 50 50.71
Thur.	19	11 48 20.55	8.973	1 15 49.5	58.30	6 26.71	0.883	11 54 47.26
Frid.	20	11 51 55.97	8.977	0 52 29.4	58.37	6 47.84	0.879	11 58 43.81
Sat.	21	11 55 31.48	8.981	0 29 7.6	58.43	7 8.88	0.875	12 2 40.36
Sun.	22	11 59 7.09	8.987	N. 0° 5' 44.5"	58.48	7 29.83	0.869	12 6 36.92
Mon.	23	12 2 42.83	8.992	S. 0 17 39.5	58.51	7 50.64	0.864	12 10 33.47
Tues.	24	12 6 18.73	8.999	0 41 4.3	58.53	8 11.29	0.857	12 14 30.02
Wed.	25	12 9 54.80	9.007	1 4 29.3	58.54	8 31.78	0.849	12 18 26.58
Thur.	26	12 13 31.07	9.016	1 27 54.2	58.54	8 52.06	0.840	12 22 23.13
Frid.	27	12 17 7.55	9.025	1 51 18.8	58.51	9 12.14	0.831	12 26 19.69
Sat.	28	12 20 44.27	9.035	2 14 42.7	58.46	9 31.97	0.821	12 30 16.24
Sun.	29	12 24 21.23	9.045	2 38 5.5	58.41	9 51.56	0.811	12 34 12.79
Mon.	30	12 27 58.47	9.057	3 1 26.8	58.35	10 10.87	0.799	12 38 9.24
Tues.	31	12 31 36.00	9.069	S. 3 24 46.3	58.26	10 29.90	0.787	12 42 5.90

NOTE.—The Semidiameter for Mean Noon may be assumed the same as that for Apparent Noon.

Diff. for 1 hour  
+9".8565

AT GREENWICH MEAN NOON.											
Day of the Month.	Day of the Year.	THE SUN'S					Logarithm of the Radius Vector of the Earth.	Diff. for 1 hour.	Mean Time of Sidereal Oh.		
		True LONGITUDE.		Diff. for 1 hour.	LATITUDE.						
		$\lambda$	$\lambda'$								
1	245	159° 18' 29.0	18° 10.4	145.39	+0.58	.0037023	-43.7	13 <sup>h</sup> 14 <sup>m</sup> 0.26 <sup>s</sup>			
2	246	160 16 39.3	16 20.5	145.47	0.59	.0035963	44.4	13 10 4.35			
3	247	161 14 51.3	14 32.5	145.54	0.58	.0034886	45.2	13 6 8.44			
4	248	162 13 4.9	12 46.0	145.61	0.54	.0033792	45.9	13 2 12.54			
5	249	163 11 20.2	11 1.2	145.68	0.46	.0032682	46.5	12 58 16.63			
6	250	164 9 37.1	9 17.9	145.75	0.38	.0031557	47.1	12 54 20.72			
7	251	165 7 55.6	7 36.4	145.81	0.26	.0030418	47.7	12 50 24.81			
8	252	166 6 15.7	5 56.4	145.88	+0.13	.0029266	48.2	12 46 28.91			
9	253	167 4 37.4	4 18.7	145.94	0.00	.0028103	48.6	12 42 33.00			
10	254	168 3 0.6	2 41.0	146.01	-0.14	.0026931	49.0	12 38 37.09			
11	255	169 1 25.4	1 5.8	146.07	0.25	.0025751	49.3	12 34 41.18			
12	256	169 59 51.8	59 32.0	146.14	0.35	.0024564	49.5	12 30 45.28			
13	257	170 58 19.9	58 0.1	146.21	0.44	.0023372	49.7	12 26 49.37			
14	258	171 56 49.7	56 29.7	146.28	0.50	.0022176	49.8	12 22 53.46			
15	259	172 55 21.1	55 1.1	146.35	0.54	.0020977	49.9	12 18 57.55			
16	260	173 53 54.2	53 34.1	146.42	0.54	.0019778	50.0	12 15 1.65			
17	261	174 52 29.2	52 9.0	146.50	0.50	.0018579	50.0	12 11 5.74			
18	262	175 51 6.2	50 45.9	146.58	0.45	.0017379	50.0	12 7 9.83			
19	263	176 49 45.1	49 24.7	146.66	0.36	.0016179	50.0	12 3 13.92			
20	264	177 48 26.1	48 5.6	146.75	0.26	.0014979	50.0	11 59 18.03			
21	265	178 47 9.4	46 48.8	146.84	-0.13	.0013779	50.0	11 55 22.12			
22	266	179 45 54.8	45 34.5	146.93	+0.01	.0012578	50.0	11 51 26.21			
23	267	180 44 42.3	44 21.5	147.03	0.14	.0011376	50.1	11 47 30.30			
24	268	181 43 32.1	43 11.2	147.12	0.27	.0010172	50.2	11 43 34.39			
25	269	182 42 24.3	42 3.0	147.22	0.39	.0008964	50.4	11 39 38.48			
26	270	183 41 18.8	40 57.7	147.31	0.48	.0007753	50.6	11 35 42.57			
27	271	184 40 15.6	39 54.4	147.41	0.56	.0006537	50.8	11 31 46.66			
28	272	185 39 14.6	38 53.4	147.50	0.62	.0005316	51.0	11 27 50.76			
29	273	186 38 15.8	37 54.4	147.59	0.63	.0004089	51.3	11 23 54.85			
30	274	187 37 19.2	36 57.7	147.68	0.62	.0002855	51.5	11 19 58.94			
31	275	188 36 24.8	36 3.2	147.77	+0.58	.0001613	-51.9	11 16 3.04			
NOTE: $\lambda$ corresponds to the true equinox of the date, $\lambda'$ to the mean equinox of January 0d.											
								Diff. for 1 hour — 9 <sup>s</sup> .8296			

## GREENWICH MEAN TIME.

## THE MOON'S

Day of the Month.	SEMI- DIAMETER.		HORIZONTAL PARALLAX.				MERIDIAN PASSAGE.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 hour.	Midnight.	Diff. for 1 hour.		Diff. for 1 hour.	
							<sup>h</sup> <sup>m</sup>	<sup>m</sup>	
1	14 49.1	14 51.0	54 16.1	+0.54	54 23.3	+0.65	23 43.9	1.83	28.1
2	14 53.3	14 55.8	54 31.7	0.74	54 41.1	0.82	6		29.1
3	14 58.7	15 1.7	54 51.4	0.90	55 2.7	0.97	0 27.1	1.78	0.5
4	15 5.0	15 8.5	55 14.8	1.04	55 27.7	1.11	1 9.4	1.76	1.5
5	15 12.3	15 16.2	55 41.4	1.17	55 55.8	1.24	1 51.8	1.78	2.5
6	15 20.3	15 24.7	56 11.1	1.29	56 27.0	1.35	2 35.3	1.81	3.5
7	15 29.2	15 33.9	56 43.5	1.41	57 0.8	1.46	3 20.4	1.96	4.5
8	15 38.7	15 43.7	57 18.6	1.51	57 37.0	1.55	4 8.7	2.09	5.5
9	15 48.8	15 54.0	57 55.7	1.58	58 14.8	1.59	5 0.9	2.27	6.5
10	15 59.2	16 4.4	58 33.9	1.58	58 52.7	1.55	5 57.5	2.44	7.5
11	16 9.3	16 14.1	59 11.0	1.49	59 28.5	1.40	6 57.7	2.56	8.5
12	16 18.4	16 22.4	59 44.6	1.28	59 59.0	1.11	8 0.0	2.60	9.5
13	16 25.7	16 28.3	60 11.2	0.91	60 20.7	0.67	9 2.0	2.54	10.5
14	16 30.1	16 30.9	60 27.2	+0.40	60 30.3	+0.11	10 1.7	2.42	11.5
15	16 30.8	16 29.6	60 29.7	-0.20	60 25.4	-0.52	10 58.1	2.28	12.5
16	16 27.4	16 24.2	60 17.3	0.83	60 5.5	1.13	11 51.2	2.15	13.5
17	16 20.0	16 15.0	59 50.3	1.41	59 31.9	1.65	12 41.6	2.06	14.5
18	16 9.3	16 3.0	59 10.9	1.85	58 47.8	2.00	13 30.4	2.01	15.5
19	15 56.3	15 49.3	58 23.1	2.11	57 57.4	2.17	14 18.6	2.01	16.5
20	15 42.2	15 35.1	57 31.2	2.18	57 5.2	2.15	15 7.0	2.03	17.5
21	15 28.2	15 21.5	56 39.8	2.07	56 15.6	1.96	15 56.2	2.07	18.5
22	15 15.4	15 9.7	55 52.9	1.82	55 31.9	1.66	16 46.4	2.11	19.5
23	15 4.5	15 0.0	55 13.0	1.48	54 56.5	1.28	17 37.2	2.12	20.5
24	14 56.2	14 53.0	54 42.3	1.08	54 30.7	0.87	18 28.2	2.11	21.5
25	14 50.4	14 48.7	54 21.5	0.65	54 15.0	0.44	19 18.6	2.07	22.5
26	14 47.7	14 47.2	54 11.0	-0.23	54 9.4	-0.03	20 7.5	2.00	23.5
27	14 47.5	14 48.3	54 10.3	+0.16	54 13.3	+0.34	20 54.6	1.92	24.5
28	14 49.7	14 51.6	54 18.5	0.51	54 25.6	0.67	21 39.9	1.85	25.5
29	14 54.0	14 56.9	54 34.5	0.80	54 44.8	0.92	22 23.7	1.80	26.5
30	15 0.1	15 3.6	54 56.6	1.03	55 9.4	1.11	23 6.6	1.78	27.5
31	15 7.3	15 11.2	55 23.2	+1.17	55 37.5	+1.22	23 49.3	1.79	28.5

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SUNDAY 1.					TUESDAY 3.				
0	9 44 47.04	2.0013	N. 18° 39' 53.6"	9.259	0	11 17 56.70	1.8925	N. 9° 53' 20.2"	12.399
1	9 46 47.03	1.9985	18 30 36.0	9.335	1	11 19 50.21	1.8919	9 40 55.3	12.436
2	9 48 46.85	1.9957	18 21 13.4	9.419	2	11 21 43.64	1.8899	9 28 27.6	12.485
3	9 50 46.51	1.9929	18 11 45.8	9.501	3	11 23 37.00	1.8887	9 15 57.1	12.530
4	9 52 46.00	1.9900	18 2 13.3	9.583	4	11 25 30.28	1.8874	9 3 24.0	12.574
5	9 54 45.31	1.9870	17 52 35.9	9.669	5	11 27 23.49	1.8861	8 50 48.3	12.616
6	9 56 44.45	1.9844	17 42 53.7	9.741	6	11 29 16.62	1.8850	8 38 10.1	12.657
7	9 58 43.42	1.9815	17 33 6.9	9.819	7	11 31 9.69	1.8840	8 25 29.5	12.698
8	10 0 42.23	1.9788	17 23 15.4	9.897	8	11 33 2.70	1.8830	8 12 46.4	12.738
9	10 2 40.86	1.9762	17 13 19.2	9.975	9	11 34 55.65	1.8821	8 0 0.9	12.778
10	10 4 39.37	1.9735	17 3 18.4	10.052	10	11 36 48.54	1.8811	7 47 13.0	12.818
11	10 6 37.69	1.9706	16 53 13.0	10.127	11	11 38 41.38	1.8804	7 34 22.8	12.856
12	10 8 35.84	1.9679	16 43 3.2	10.202	12	11 40 34.18	1.8795	7 21 30.3	12.894
13	10 10 33.83	1.9653	16 32 48.8	10.277	13	11 42 26.92	1.8787	7 8 35.6	12.930
14	10 12 31.67	1.9627	16 22 30.0	10.350	14	11 44 19.62	1.8780	6 55 38.7	12.966
15	10 14 29.36	1.9601	16 12 6.8	10.424	15	11 46 12.28	1.8773	6 42 39.7	13.001
16	10 16 26.89	1.9575	16 1 39.2	10.496	16	11 48 4.90	1.8767	6 29 38.6	13.035
17	10 18 24.26	1.9548	15 51 7.3	10.567	17	11 49 57.49	1.8762	6 16 35.5	13.069
18	10 20 21.47	1.9522	15 40 31.2	10.637	18	11 51 50.05	1.8757	6 3 30.4	13.101
19	10 22 18.53	1.9499	15 29 50.9	10.708	19	11 53 42.58	1.8753	5 50 23.4	13.133
20	10 24 15.45	1.9475	15 19 6.5	10.774	20	11 55 35.09	1.8750	5 37 14.5	13.164
21	10 26 12.22	1.9450	15 8 18.0	10.843	21	11 57 27.58	1.8747	5 24 3.7	13.195
22	10 28 8.84	1.9425	14 57 25.4	10.910	22	11 59 20.05	1.8745	5 10 51.1	13.224
23	10 30 5.32	1.9402	N. 14° 46' 28.8"	10.977	23	12 1 12.51	1.8743	N. 4° 57' 36.9"	13.251
MONDAY 2.					WEDNESDAY 4.				
0	10 32 1.66	1.9378	N. 14° 35' 28.2"	11.043	0	12 3 4.96	1.8749	N. 4° 44' 21.0"	13.279
1	10 33 57.86	1.9355	14 24 23.7	11.108	1	12 4 57.40	1.8741	4 31 3.5	13.305
2	10 35 53.92	1.9331	14 13 15.3	11.173	2	12 6 49.84	1.8740	4 17 44.4	13.332
3	10 37 49.83	1.9308	14 2 3.0	11.236	3	12 8 42.27	1.8740	4 4 23.7	13.358
4	10 39 45.61	1.9287	13 50 46.9	11.300	4	12 10 34.71	1.8743	3 51 1.5	13.382
5	10 41 41.27	1.9266	13 39 27.0	11.363	5	12 12 27.16	1.8743	3 37 37.9	13.404
6	10 43 36.80	1.9245	13 28 3.4	11.423	6	12 14 19.62	1.8745	3 24 13.0	13.426
7	10 45 32.20	1.9223	13 16 36.2	11.483	7	12 16 12.09	1.8747	3 10 46.8	13.448
8	10 47 27.47	1.9202	13 5 5.4	11.543	8	12 18 4.58	1.8750	2 57 19.3	13.468
9	10 49 22.62	1.9182	12 53 31.0	11.603	9	12 19 57.09	1.8754	2 43 50.6	13.488
10	10 51 17.65	1.9162	12 41 53.1	11.660	10	12 21 49.63	1.8759	2 30 20.8	13.506
11	10 53 12.56	1.9141	12 30 11.8	11.718	11	12 23 42.20	1.8763	2 16 49.9	13.524
12	10 55 7.35	1.9122	12 18 27.0	11.775	12	12 25 34.79	1.8768	2 3 17.9	13.542
13	10 57 2.03	1.9104	12 6 38.8	11.831	13	12 27 27.42	1.8775	1 49 44.9	13.559
14	10 58 56.60	1.9085	11 54 47.3	11.888	14	12 29 20.09	1.8782	1 36 10.9	13.575
15	11 0 51.05	1.9067	11 42 52.5	11.940	15	12 31 12.80	1.8789	1 22 35.9	13.590
16	11 2 45.40	1.9050	11 30 54.5	11.993	16	12 33 5.56	1.8797	1 9 0.1	13.604
17	11 4 39.65	1.9033	11 18 53.4	12.044	17	12 34 58.37	1.8807	0 55 23.5	13.616
18	11 6 33.80	1.9017	11 6 49.2	12.096	18	12 36 51.24	1.8817	0 41 46.2	13.628
19	11 8 27.85	1.9000	10 54 41.9	12.148	19	12 38 44.17	1.8826	0 28 8.2	13.638
20	11 10 21.80	1.8985	10 42 31.5	12.199	20	12 40 37.15	1.8836	0 14 29.6	13.648
21	11 12 15.66	1.8970	10 30 18.0	12.249	21	12 42 30.20	1.8847	N. 0° 0' 50.4"	13.658
22	11 14 9.43	1.8954	10 18 1.6	12.298	22	12 44 23.32	1.8860	S. 0° 12' 49.4"	13.668
23	11 16 3.11	1.8939	10 5 42.3	12.345	23	12 46 16.52	1.8879	0 26 29.7	13.675
24	11 17 56.70	1.8925	N. 9° 53' 20.2"	12.392	24	12 48 9.79	1.8895	S. 0° 40' 10.4"	13.682

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
THURSDAY 5.					SATURDAY 7.				
0	12 48 9.79	1.8885	S. 0 40' 10.4"	13.682	0	14 21 36.53	2.0310	S. 11° 26' 32.3"	12.859
1	12 50 3.14	1.8899	0 53 51.5	13.689	1	14 23 38.53	2.0356	11 39 22.6	12.817
2	12 51 56.58	1.8914	1 7 33.0	13.694	2	14 25 40.81	2.0404	11 52 10.4	12.774
3	12 53 50.11	1.8929	1 21 14.7	13.697	3	14 27 43.38	2.0453	12 4 55.5	12.738
4	12 55 43.73	1.8945	1 34 56.6	13.699	4	14 29 46.24	2.0500	12 17 37.8	12.681
5	12 57 37.45	1.8960	1 48 38.6	13.701	5	14 31 49.38	2.0547	12 30 17.3	12.634
6	12 59 31.27	1.8979	2 2 20.7	13.703	6	14 33 52.81	2.0596	12 42 53.9	12.584
7	13 1 25.20	1.8997	2 16 2.9	13.703	7	14 35 56.54	2.0647	12 55 27.4	12.533
8	13 3 19.23	1.9014	2 29 45.1	13.702	8	14 38 0.58	2.0700	13 7 57.9	12.481
9	13 5 13.37	1.9033	2 43 27.2	13.701	9	14 40 4.93	2.0756	13 20 25.2	12.438
10	13 7 7.63	1.9054	2 57 9.2	13.698	10	14 42 9.58	2.0809	13 32 49.3	12.374
11	13 9 2.02	1.9075	3 10 51.0	13.694	11	14 44 14.55	2.0854	13 45 10.1	12.319
12	13 10 56.53	1.9095	3 24 32.5	13.689	12	14 46 19.83	2.0907	13 57 27.6	12.263
13	13 12 51.17	1.9117	3 38 13.7	13.684	13	14 48 25.43	2.0961	14 9 41.7	12.206
14	13 14 45.94	1.9140	3 51 54.6	13.679	14	14 50 31.36	2.1016	14 21 52.4	12.148
15	13 16 40.85	1.9163	4 5 35.2	13.673	15	14 52 37.62	2.1071	14 33 59.5	12.087
16	13 18 35.90	1.9188	4 19 15.3	13.664	16	14 54 44.21	2.1125	14 46 2.9	12.025
17	13 20 31.10	1.9219	4 32 54.9	13.655	17	14 56 51.13	2.1181	14 58 2.5	11.961
18	13 22 26.44	1.9238	4 46 33.9	13.645	18	14 58 58.38	2.1238	15 9 58.3	11.897
19	13 24 21.94	1.9263	5 0 12.3	13.634	19	15 1 5.97	2.1294	15 21 50.2	11.831
20	13 26 17.60	1.9288	5 13 50.0	13.620	20	15 3 13.91	2.1353	15 33 38.1	11.764
21	13 28 13.41	1.9316	5 27 26.8	13.606	21	15 5 22.21	2.1412	15 45 21.9	11.696
22	13 30 9.39	1.9344	5 41 2.8	13.593	22	15 7 30.85	2.1471	15 57 1.6	11.627
23	13 32 5.54	1.9373	S. 5 54 38.0	13.579	23	15 9 39.85	2.1529	S. 16 8 37.1	11.556
FRIDAY 6.					SUNDAY 8.				
0	13 34 1.87	1.9404	S. 6 8 12.3	13.563	0	15 11 49.20	2.1588	S. 16 20 8.3	11.484
1	13 35 58.38	1.9434	6 21 45.6	13.548	1	15 13 58.91	2.1649	16 31 35.2	11.411
2	13 37 55.07	1.9463	6 35 17.8	13.527	2	15 16 8.99	2.1710	16 42 57.7	11.337
3	13 39 51.93	1.9494	6 48 48.9	13.508	3	15 18 19.43	2.1771	16 54 15.7	11.261
4	13 41 48.99	1.9527	7 2 18.7	13.488	4	15 20 30.24	2.1833	17 5 29.1	11.184
5	13 43 46.25	1.9560	7 15 47.4	13.467	5	15 22 41.42	2.1894	17 16 37.8	11.105
6	13 45 43.71	1.9593	7 29 14.8	13.445	6	15 24 52.97	2.1956	17 27 41.7	11.024
7	13 47 41.37	1.9627	7 42 40.8	13.421	7	15 27 4.89	2.2018	17 38 40.7	10.942
8	13 49 39.24	1.9662	7 56 5.4	13.397	8	15 29 17.19	2.2082	17 49 34.8	10.859
9	13 51 37.31	1.9697	8 9 28.5	13.372	9	15 31 29.88	2.2146	18 0 23.8	10.774
10	13 53 35.60	1.9734	8 22 50.1	13.346	10	15 33 42.95	2.2210	18 11 7.7	10.688
11	13 55 34.11	1.9770	8 36 10.1	13.318	11	15 35 56.40	2.2273	18 21 46.4	10.601
12	13 57 32.84	1.9808	8 49 28.3	13.289	12	15 38 10.22	2.2336	18 32 19.8	10.512
13	13 59 31.80	1.9845	9 2 44.8	13.260	13	15 40 24.43	2.2401	18 42 47.9	10.423
14	14 1 30.99	1.9885	9 15 59.5	13.229	14	15 42 39.03	2.2467	18 53 10.6	10.333
15	14 3 30.42	1.9925	9 29 12.3	13.197	15	15 44 54.03	2.2533	19 3 27.8	10.240
16	14 5 30.09	1.9965	9 42 23.2	13.165	16	15 47 9.43	2.2599	19 13 39.4	10.144
17	14 7 30.00	2.0006	9 55 32.1	13.131	17	15 49 25.22	2.2664	19 23 45.3	10.048
18	14 9 30.16	2.0047	10 8 39.0	13.096	18	15 51 41.40	2.2730	19 33 45.4	9.952
19	14 11 30.57	2.0090	10 21 43.7	13.060	19	15 53 57.98	2.2797	19 43 39.5	9.852
20	14 13 31.24	2.0133	10 34 46.2	13.023	20	15 56 14.96	2.2863	19 53 27.6	9.751
21	14 15 32.16	2.0176	10 47 46.3	12.982	21	15 58 32.34	2.2930	20 3 9.6	9.649
22	14 17 33.35	2.0221	11 0 44.1	12.943	22	16 0 50.12	2.2997	20 12 45.5	9.546
23	14 19 34.81	2.0265	11 13 39.5	12.902	23	16 3 8.30	2.3064	20 22 15.2	9.442
24	14 21 36.53	2.0310	S. 11 26 32.3	12.859	24	16 5 26.89	2.3132	S. 20 31 38.6	9.336

## GREENWICH MEAN TIME

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
MONDAY 9.					WEDNESDAY 11.				
0	16 <sup>h</sup> 5 <sup>m</sup> 26.89	2.3139	S. 20° 31' 38.6"	9.336	0	18 <sup>h</sup> 3 <sup>m</sup> 50.73	2.5995	S. 25° 30' 27.4"	2.601
1	16 7 45.89	2.3200	20 40 55.6	9.299	1	18 6 26.82	2.6035	25 32 58.3	2.499
2	16 10 5.29	2.3266	20 50 6.1	9.190	2	18 9 3.15	2.6075	25 35 18.9	2.957
3	16 12 25.08	2.3339	20 59 10.0	9.010	3	18 11 39.72	2.6114	25 37 29.2	2.066
4	16 14 45.28	2.3401	21 8 7.3	8.899	4	18 14 16.52	2.6152	25 39 29.1	1.913
5	16 17 5.89	2.3471	21 16 57.9	8.786	5	18 16 53.54	2.6188	25 41 18.8	1.740
6	16 19 26.92	2.3538	21 25 41.7	8.671	6	18 19 30.77	2.6222	25 42 58.0	1.565
7	16 21 48.35	2.3605	21 34 18.5	8.554	7	18 22 8.20	2.6254	25 44 26.7	1.380
8	16 24 10.18	2.3671	21 42 48.2	8.436	8	18 24 45.82	2.6287	25 45 44.9	1.215
9	16 26 32.40	2.3738	21 51 10.8	8.317	9	18 27 23.64	2.6319	25 46 52.5	1.038
10	16 28 55.02	2.3804	21 59 26.2	8.196	10	18 30 1.64	2.6346	25 47 49.5	0.861
11	16 31 18.05	2.3872	22 7 34.3	8.073	11	18 32 39.80	2.6372	25 48 35.9	0.685
12	16 33 41.49	2.3940	22 15 35.0	7.950	12	18 35 18.11	2.6398	25 49 11.7	0.507
13	16 36 5.33	2.4006	22 23 28.3	7.825	13	18 37 56.58	2.6424	25 49 36.7	0.327
14	16 38 29.56	2.4071	22 31 14.1	7.700	14	18 40 35.20	2.6450	25 49 50.9	-0.147
15	16 40 54.18	2.4137	22 38 52.3	7.572	15	18 43 13.97	2.6473	25 49 54.3	+0.033
16	16 43 19.20	2.4204	22 46 22.8	7.443	16	18 45 52.87	2.6493	25 49 46.9	0.213
17	16 45 44.62	2.4271	22 53 45.5	7.319	17	18 48 31.88	2.6512	25 49 28.7	0.393
18	16 48 10.45	2.4336	23 1 0.3	7.179	18	18 51 11.01	2.6529	25 48 59.7	0.574
19	16 50 36.66	2.4400	23 8 7.0	7.044	19	18 53 50.23	2.6544	25 48 19.8	0.756
20	16 53 3.25	2.4464	23 15 5.6	6.908	20	18 56 29.54	2.6560	25 47 29.0	0.938
21	16 55 30.22	2.4527	23 21 56.0	6.771	21	18 59 8.95	2.6575	25 46 27.3	1.119
22	16 57 57.57	2.4590	23 28 38.2	6.634	22	19 1 48.43	2.6585	25 45 14.7	1.309
23	17 0 25.30	2.4654	S. 23° 35' 12.1"	6.495	23	19 4 27.97	2.6595	S. 25° 43' 51.1"	1.484
TUESDAY 10.					THURSDAY 12.				
0	17 2 53.42	2.4718	S. 23° 41' 37.6"	6.354	0	19 7 7.57	2.6603	S. 25° 42' 16.6"	1.667
1	17 5 21.91	2.4779	23 47 54.6	6.214	1	19 9 47.21	2.6610	25 40 31.1	1.849
2	17 7 50.77	2.4840	23 54 3.1	6.070	2	19 12 26.89	2.6617	25 38 34.7	2.032
3	17 10 19.99	2.4901	24 0 3.0	5.925	3	19 15 6.62	2.6623	25 36 27.3	2.215
4	17 12 49.58	2.4962	24 5 54.2	5.780	4	19 17 46.37	2.6625	25 34 8.9	2.399
5	17 15 19.53	2.5023	24 11 36.6	5.632	5	19 20 26.12	2.6624	25 31 39.5	2.581
6	17 17 49.85	2.5083	24 17 10.0	5.489	6	19 23 5.86	2.6623	25 28 59.2	2.763
7	17 20 20.52	2.5140	24 22 34.4	5.332	7	19 25 45.60	2.6622	25 26 8.0	2.944
8	17 22 51.53	2.5196	24 27 49.8	5.181	8	19 28 25.33	2.6620	25 23 5.9	3.126
9	17 25 22.87	2.5252	24 32 56.1	5.028	9	19 31 5.05	2.6617	25 19 52.9	3.308
10	17 27 54.55	2.5308	24 37 53.2	4.874	10	19 33 44.74	2.6610	25 16 29.0	3.489
11	17 30 26.57	2.5364	24 42 41.0	4.718	11	19 36 24.37	2.6601	25 12 54.2	3.671
12	17 32 58.92	2.5419	24 47 19.4	4.561	12	19 39 3.96	2.6599	25 9 8.5	3.853
13	17 35 31.59	2.5472	24 51 48.4	4.405	13	19 41 43.48	2.6592	25 5 11.9	4.033
14	17 38 4.58	2.5525	24 56 8.0	4.247	14	19 44 22.94	2.6571	25 1 4.5	4.213
15	17 40 37.89	2.5578	25 0 18.0	4.087	15	19 47 2.32	2.6556	24 56 46.3	4.393
16	17 43 11.51	2.5628	25 4 18.4	3.926	16	19 49 41.61	2.6541	24 52 17.3	4.573
17	17 45 45.43	2.5678	25 8 9.1	3.763	17	19 52 20.81	2.6526	24 47 37.6	4.751
18	17 48 19.64	2.5726	25 11 50.0	3.600	18	19 54 59.92	2.6509	24 42 47.2	4.929
19	17 50 54.14	2.5773	25 15 21.1	3.435	19	19 57 38.92	2.6491	24 37 46.1	5.106
20	17 53 28.92	2.5821	25 18 42.3	3.270	20	20 0 17.80	2.6470	24 32 34.3	5.285
21	17 56 3.98	2.5868	25 21 53.6	3.105	21	20 2 56.55	2.6447	24 27 11.9	5.462
22	17 58 39.31	2.5909	25 24 54.9	2.938	22	20 5 35.16	2.6424	24 21 38.9	5.638
23	18 1 14.89	2.5952	25 27 46.2	2.771	23	20 8 13.63	2.6403	24 15 55.4	5.813
24	18 3 50.73	2.5995	S. 25° 30' 27.4"	2.601	24	20 10 51.98	2.6377	S. 24° 10' 1.4"	5.987

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
FRIDAY 13.					SUNDAY 15.				
0	20 10 51.98	2.6377	S. 24 10' 1.4	5.987	0	22 12 44.56	2.4178	S. 16 24' 25.4	12.839
1	20 13 30.16	2.6348	24 3 57.0	6.160	1	22 15 9.46	2.4123	16 11 32.0	12.941
2	20 16 8.16	2.6320	23 57 42.2	6.334	2	22 17 34.04	2.4071	15 58 32.5	13.043
3	20 18 45.99	2.6290	23 51 17.0	6.506	3	22 19 58.30	2.4016	15 45 26.9	13.143
4	20 21 23.64	2.6260	23 44 41.5	6.676	4	22 22 22.23	2.3961	15 32 15.4	13.240
5	20 24 1.11	2.6230	23 37 55.9	6.845	5	22 24 45.83	2.3906	15 18 58.2	13.334
6	20 26 38.40	2.6198	23 31 0.1	7.014	6	22 27 9.10	2.3851	15 5 35.4	13.426
7	20 29 15.48	2.6169	23 23 54.2	7.182	7	22 29 32.05	2.3796	14 52 7.1	13.517
8	20 31 52.35	2.6138	23 16 38.3	7.348	8	22 31 54.68	2.3746	14 38 33.4	13.605
9	20 34 29.02	2.6093	23 9 12.5	7.513	9	22 34 16.99	2.3692	14 24 54.5	13.692
10	20 37 5.47	2.6056	23 1 36.8	7.678	10	22 36 38.98	2.3638	14 11 10.4	13.777
11	20 39 41.69	2.6017	22 53 51.2	7.842	11	22 39 0.65	2.3585	13 57 21.3	13.859
12	20 42 17.68	2.5979	22 45 55.8	8.005	12	22 41 22.00	2.3532	13 43 27.3	13.940
13	20 44 53.43	2.5939	22 37 50.6	8.166	13	22 43 43.03	2.3482	13 29 28.5	14.020
14	20 47 28.94	2.5898	22 29 35.9	8.325	14	22 46 3.75	2.3429	13 15 24.9	14.099
15	20 50 4.21	2.5857	22 21 11.6	8.484	15	22 48 24.17	2.3377	13 1 16.7	14.175
16	20 52 39.23	2.5815	22 12 37.9	8.640	16	22 50 44.28	2.3325	12 47 4.0	14.249
17	20 55 13.99	2.5779	22 3 54.9	8.794	17	22 53 4.07	2.3272	12 32 46.9	14.321
18	20 57 48.49	2.5738	21 55 2.7	8.947	18	22 55 23.55	2.3222	12 18 25.5	14.391
19	21 0 22.72	2.5693	21 46 1.3	9.100	19	22 57 42.73	2.3173	12 4 0.0	14.459
20	21 2 56.68	2.5637	21 36 50.7	9.253	20	23 0 1.62	2.3119	11 49 30.5	14.525
21	21 5 30.36	2.5590	21 27 31.0	9.403	21	23 2 20.22	2.3075	11 34 57.0	14.590
22	21 8 3.76	2.5543	21 18 2.4	9.551	22	23 4 38.52	2.3025	11 20 19.7	14.653
23	21 10 36.88	2.5497	S. 21 8 24.9	9.699	23	23 6 56.52	2.2975	S. 11 5 38.7	14.713
SATURDAY 14.					MONDAY 16.				
0	21 13 9.72	2.5449	S. 20 58 38.6	9.845	0	23 9 14.22	2.2929	S. 10 50 54.1	14.772
1	21 15 42.26	2.5398	20 48 43.6	9.990	1	23 11 31.64	2.2880	10 36 6.1	14.826
2	21 18 14.50	2.5349	20 38 39.9	10.133	2	23 13 48.78	2.2833	10 21 14.8	14.882
3	21 20 46.45	2.5300	20 28 27.7	10.273	3	23 16 5.64	2.2787	10 6 20.3	14.934
4	21 23 18.10	2.5249	20 18 7.1	10.413	4	23 18 22.22	2.2742	9 51 22.7	14.986
5	21 25 49.44	2.5199	20 7 38.2	10.550	5	23 20 38.53	2.2695	9 36 22.0	15.036
6	21 28 20.48	2.5147	19 57 1.2	10.685	6	23 22 54.56	2.2649	9 21 18.4	15.084
7	21 30 51.21	2.5095	19 46 16.1	10.820	7	23 25 10.32	2.2605	9 6 12.0	15.128
8	21 33 21.63	2.5043	19 35 22.9	10.954	8	23 27 25.82	2.2562	8 51 3.1	15.169
9	21 35 51.73	2.4992	19 24 21.7	11.085	9	23 29 41.06	2.2518	8 35 51.7	15.210
10	21 38 21.52	2.4939	19 13 12.7	11.214	10	23 31 56.04	2.2475	8 20 37.9	15.250
11	21 40 50.99	2.4884	19 1 56.0	11.342	11	23 34 10.76	2.2432	8 5 21.7	15.289
12	21 43 20.13	2.4830	18 50 31.7	11.469	12	23 36 25.22	2.2389	7 50 3.3	15.325
13	21 45 48.95	2.4777	18 38 59.8	11.594	13	23 38 39.43	2.2348	7 34 42.7	15.363
14	21 48 17.45	2.4724	18 27 20.5	11.716	14	23 40 53.40	2.2309	7 19 20.0	15.394
15	21 50 45.63	2.4670	18 15 33.9	11.837	15	23 43 7.14	2.2270	7 3 55.4	15.425
16	21 53 13.48	2.4615	18 3 40.1	11.955	16	23 45 20.64	2.2230	6 48 29.0	15.453
17	21 55 41.01	2.4561	17 51 39.3	12.071	17	23 47 33.90	2.2190	6 33 1.1	15.478
18	21 58 8.21	2.4506	17 39 31.6	12.185	18	23 49 46.92	2.2151	6 17 31.7	15.503
19	22 0 35.08	2.4452	17 27 17.1	12.299	19	23 51 59.71	2.2114	6 2 0.8	15.527
20	22 3 1.63	2.4398	17 14 55.8	12.410	20	23 54 12.29	2.2079	5 46 28.5	15.549
21	22 5 27.86	2.4344	17 2 27.9	12.519	21	23 56 24.66	2.2043	5 30 54.9	15.569
22	22 7 53.76	2.4289	16 49 53.5	12.628	22	23 58 36.81	2.2007	5 15 20.2	15.587
23	22 10 19.33	2.4234	16 37 12.6	12.735	23	0 0 48.74	2.1971	4 59 44.5	15.603
24	22 12 44.56	2.4178	S. 16 24 25.4	12.839	24	0 3 0.45	2.1935	S. 4 44 7.9	15.618



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
TUESDAY 17.					THURSDAY 19.				
0	<sup>h</sup> 0 <sup>m</sup> 3 <sup>s</sup> 0.45	2.1935	S. 4 44' 7.9"	15.618	0	<sup>h</sup> 1 45 35.70	2.1058	N. 7 32' 17.5"	14.506
1	0 5 11.96	2.1903	4 28 30.4	15.632	1	1 47 42.04	2.1054	7 46 46.2	14.450
2	0 7 23.28	2.1870	4 12 52.1	15.643	2	1 49 48.35	2.1050	8 1 11.5	14.393
3	0 9 34.41	2.1838	3 57 13.2	15.653	3	1 51 54.64	2.1048	8 15 33.3	14.335
4	0 11 45.34	2.1806	3 41 33.8	15.661	4	1 54 0.93	2.1047	8 29 51.6	14.275
5	0 13 56.08	2.1774	3 25 53.9	15.669	5	1 56 7.21	2.1047	8 44 6.3	14.214
6	0 16 6.63	2.1744	3 10 13.6	15.674	6	1 58 13.49	2.1047	8 58 17.3	14.151
7	0 18 17.00	2.1714	2 54 33.1	15.675	7	2 0 19.77	2.1047	9 12 24.5	14.089
8	0 20 27.20	2.1686	2 38 52.6	15.675	8	2 2 26.05	2.1047	9 26 28.0	14.024
9	0 22 37.23	2.1658	2 23 12.1	15.674	9	2 4 32.34	2.1049	9 40 27.4	13.956
10	0 24 47.09	2.1629	2 7 31.7	15.672	10	2 6 38.64	2.1050	9 54 22.8	13.890
11	0 26 56.78	2.1601	1 51 51.4	15.669	11	2 8 44.95	2.1052	10 8 14.3	13.824
12	0 29 6.31	2.1575	1 36 11.4	15.664	12	2 10 51.26	2.1054	10 22 1.7	13.755
13	0 31 15.68	2.1549	1 20 31.7	15.658	13	2 12 57.59	2.1056	10 35 44.9	13.685
14	0 33 24.90	2.1525	1 4 52.4	15.650	14	2 15 3.95	2.1062	10 49 23.9	13.615
15	0 35 33.98	2.1501	0 49 13.7	15.640	15	2 17 10.34	2.1067	11 2 58.7	13.544
16	0 37 42.91	2.1477	0 33 35.6	15.629	16	2 19 16.75	2.1071	11 16 29.2	13.470
17	0 39 51.70	2.1453	0 17 58.2	15.616	17	2 21 23.19	2.1076	11 29 55.2	13.395
18	0 42 0.34	2.1429	S. 0 2 21.6	15.602	18	2 23 29.66	2.1081	11 43 16.7	13.320
19	0 44 8.85	2.1406	N. 0 13 14.1	15.585	19	2 25 36.16	2.1086	11 56 33.7	13.245
20	0 46 17.24	2.1388	0 28 48.6	15.566	20	2 27 42.70	2.1093	12 9 46.2	13.169
21	0 48 25.51	2.1367	0 44 22.0	15.547	21	2 29 49.28	2.1100	12 22 54.0	13.091
22	0 50 33.65	2.1347	0 59 54.2	15.526	22	2 31 55.90	2.1107	12 35 57.1	13.012
23	0 52 41.68	2.1329	N. 1 15 25.1	15.503	23	2 34 2.57	2.1115	N 12 48 55.5	12.933
WEDNESDAY 18.					FRIDAY 20.				
0	0 54 49.59	2.1369	N. 1 30 54.6	15.480	0	2 36 9.28	2.1129	N. 13 1 49.1	12.853
1	0 56 57.39	2.1392	1 46 22.7	15.455	1	2 38 16.04	2.1130	13 14 37.9	12.772
2	0 59 5.09	2.1375	2 1 49.3	15.430	2	2 40 22.85	2.1140	13 27 21.8	12.690
3	1 1 12.69	2.1368	2 17 14.3	15.402	3	2 42 29.72	2.1149	13 40 0.7	12.606
4	1 3 20.19	2.1343	2 32 37.6	15.372	4	2 44 36.64	2.1158	13 52 34.6	12.521
5	1 5 27.60	2.1326	2 47 59.0	15.342	5	2 46 43.62	2.1169	14 5 3.3	12.435
6	1 7 34.92	2.1314	3 3 18.6	15.310	6	2 48 50.66	2.1179	14 17 26.8	12.348
7	1 9 42.16	2.1300	3 18 36.2	15.275	7	2 50 57.76	2.1189	14 29 45.1	12.261
8	1 11 49.32	2.1286	3 33 51.7	15.240	8	2 53 4.93	2.1200	14 41 58.2	12.174
9	1 13 56.39	2.1279	3 49 5.1	15.205	9	2 55 12.16	2.1211	14 54 6.0	12.086
10	1 16 3.38	2.1260	4 4 16.4	15.169	10	2 57 19.46	2.1223	15 6 8.5	11.997
11	1 18 10.31	2.1250	4 19 25.4	15.130	11	2 59 26.83	2.1234	15 18 5.6	11.906
12	1 20 17.18	2.1240	4 34 32.0	15.089	12	3 1 34.26	2.1246	15 29 57.2	11.814
13	1 22 23.99	2.1229	4 49 36.1	15.047	13	3 3 41.77	2.1258	15 41 43.3	11.722
14	1 24 30.73	2.1218	5 4 37.7	15.005	14	3 5 49.36	2.1271	15 53 23.9	11.630
15	1 26 37.41	2.1209	5 19 36.7	14.960	15	3 7 57.02	2.1283	16 4 58.9	11.536
16	1 28 44.04	2.1201	5 34 32.9	14.914	16	3 10 4.76	2.1297	16 16 28.3	11.442
17	1 30 50.63	2.1195	5 49 26.4	14.868	17	3 12 12.58	2.1311	16 27 52.0	11.347
18	1 32 57.18	2.1188	6 4 17.1	14.821	18	3 14 20.49	2.1325	16 39 10.0	11.252
19	1 35 3.69	2.1182	6 19 4.9	14.772	19	3 16 28.48	2.1338	16 50 22.3	11.156
20	1 37 10.16	2.1175	6 33 49.7	14.721	20	3 18 36.55	2.1350	17 1 28.7	11.057
21	1 39 16.58	2.1168	6 48 31.4	14.669	21	3 20 44.69	2.1364	17 12 29.2	10.960
22	1 41 22.97	2.1163	7 3 10.0	14.616	22	3 22 52.92	2.1379	17 23 23.9	10.862
23	1 43 29.34	2.1161	7 17 45.4	14.562	23	3 25 1.24	2.1395	17 34 12.7	10.763
24	1 45 35.70	2.1158	N. 7 32 17.5	14.506	24	3 27 9.66	2.1411	N. 17 44 55.5	10.663

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SATURDAY 21.					MONDAY 23.				
0	3 27 9.66	2.1411	N.17° 44' 55.5"	10.862	0	5 11 39.73	2.9090	N.24° 9' 43.4"	5.185
1	3 29 18.17	2.1425	17 55 32.2	10.562	1	5 13 52.30	2.9090	24 14 50.8	5.060
2	3 31 26.76	2.1439	18 6 2.9	10.461	2	5 16 4.92	2.9106	24 19 50.7	4.935
3	3 33 35.43	2.1454	18 16 27.5	10.358	3	5 18 17.58	2.9114	24 24 43.1	4.810
4	3 35 44.20	2.1470	18 26 45.9	10.255	4	5 20 30.29	2.9123	24 29 28.0	4.685
5	3 37 53.06	2.1486	18 36 58.1	10.150	5	5 22 43.06	2.9132	24 34 5.4	4.560
6	3 40 2.02	2.1501	18 47 3.9	10.044	6	5 24 55.88	2.9140	24 38 35.3	4.435
7	3 42 11.07	2.1516	18 57 3.4	9.939	7	5 27 8.74	2.9145	24 42 57.7	4.310
8	3 44 20.21	2.1531	19 6 56.6	9.833	8	5 29 21.63	2.9152	24 47 12.6	4.185
9	3 46 29.44	2.1546	19 16 43.4	9.726	9	5 31 34.56	2.9158	24 51 20.0	4.060
10	3 48 38.76	2.1562	19 26 23.8	9.620	10	5 33 47.53	2.9164	24 55 19.8	3.935
11	3 50 48.18	2.1579	19 35 57.8	9.512	11	5 36 0.53	2.9168	24 59 12.0	3.806
12	3 52 57.70	2.1595	19 45 25.3	9.404	12	5 38 13.54	2.9173	25 2 56.6	3.680
13	3 55 7.32	2.1610	19 54 46.3	9.296	13	5 40 26.60	2.9179	25 6 33.6	3.554
14	3 57 17.03	2.1625	20 4 0.8	9.187	14	5 42 39.68	2.9182	25 10 3.1	3.428
15	3 59 26.83	2.1641	20 13 8.7	9.077	15	5 44 52.78	2.9185	25 13 25.0	3.301
16	4 1 36.73	2.1658	20 22 10.0	8.967	16	5 47 5.90	2.9188	25 16 39.3	3.175
17	4 3 46.72	2.1674	20 31 4.7	8.856	17	5 49 19.03	2.9190	25 19 46.0	3.048
18	4 5 56.81	2.1689	20 39 52.7	8.744	18	5 51 32.18	2.9193	25 22 45.1	2.921
19	4 8 6.99	2.1704	20 48 34.0	8.633	19	5 53 45.34	2.9194	25 25 36.6	2.794
20	4 10 17.26	2.1721	20 57 8.6	8.520	20	5 55 58.50	2.9194	25 28 20.4	2.666
21	4 12 27.63	2.1737	21 5 36.4	8.406	21	5 58 11.67	2.9195	25 30 56.6	2.540
22	4 14 38.09	2.1752	21 13 57.4	8.293	22	6 0 24.84	2.9194	25 33 25.2	2.413
23	4 16 48.65	2.1767	N.21 22 11.6	8.179	23	6 2 38.00	2.9194	N.25 35 46.1	2.285
SUNDAY 22.					TUESDAY 24.				
0	4 18 59.29	2.1782	N.21 30 18.9	8.064	0	6 4 51.16	2.9193	N.25 37 59.4	2.158
1	4 21 10.0	2.1797	21 38 19.3	7.949	1	6 7 4.31	2.9191	25 40 5.1	2.031
2	4 23 20.86	2.1812	21 46 12.8	7.833	2	6 9 17.45	2.9190	25 42 3.2	1.905
3	4 25 31.78	2.1828	21 53 59.3	7.716	3	6 11 30.59	2.9189	25 43 53.7	1.778
4	4 27 42.79	2.1841	22 1 38.8	7.599	4	6 13 43.71	2.9184	25 45 36.6	1.651
5	4 29 53.88	2.1855	22 9 11.2	7.481	5	6 15 56.80	2.9180	25 47 11.8	1.523
6	4 32 5.06	2.1870	22 16 36.6	7.365	6	6 18 9.87	2.9176	25 48 39.4	1.396
7	4 34 16.33	2.1885	22 23 55.0	7.247	7	6 20 22.91	2.9171	25 49 59.4	1.269
8	4 36 27.68	2.1899	22 31 6.3	7.129	8	6 22 35.92	2.9167	25 51 11.7	1.141
9	4 38 39.12	2.1913	22 38 10.5	7.010	9	6 24 48.91	2.9162	25 52 16.3	1.013
10	4 40 50.64	2.1927	22 45 7.5	6.890	10	6 27 1.86	2.9155	25 53 13.3	0.886
11	4 43 2.24	2.1940	22 51 57.3	6.770	11	6 29 14.77	2.9148	25 54 2.7	0.760
12	4 45 13.92	2.1954	22 58 39.9	6.650	12	6 31 27.64	2.9141	25 54 44.6	0.635
13	4 47 25.68	2.1969	23 5 15.3	6.530	13	6 33 40.46	2.9132	25 55 18.9	0.508
14	4 49 37.52	2.1979	23 11 43.5	6.409	14	6 35 53.23	2.9125	25 55 45.6	0.382
15	4 51 49.43	2.1992	23 18 4.4	6.288	15	6 38 5.96	2.9116	25 56 4.8	0.256
16	4 54 1.42	2.2004	23 24 18.1	6.167	16	6 40 18.63	2.9106	25 56 16.4	0.130
17	4 56 13.48	2.2015	23 30 24.5	6.046	17	6 42 31.24	2.9097	25 56 20.5	+0.004
18	4 58 25.60	2.2026	23 36 23.6	5.924	18	6 44 43.80	2.9087	25 56 16.9	-0.123
19	5 0 37.79	2.2037	23 42 15.4	5.801	19	6 46 56.29	2.9076	25 56 5.8	0.948
20	5 2 50.05	2.2049	23 47 59.8	5.678	20	6 49 8.71	2.9065	25 55 47.2	0.373
21	5 5 2.38	2.2060	23 53 36.8	5.555	21	6 51 21.07	2.9054	25 55 21.2	0.496
22	5 7 14.77	2.2071	23 59 6.4	5.431	22	6 53 33.35	2.9041	25 54 47.7	0.622
23	5 9 27.22	2.2080	24 4 28.6	5.308	23	6 55 45.55	2.9027	25 54 6.6	0.748
24	5 11 39.73	2.2090	N.24 9 43.4	5.185	24	6 57 57.68	2.9014	N.25 53 18.0	0.873

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
WEDNESDAY 25.					FRIDAY 27.				
0	<sup>h</sup> 6 <sup>m</sup> 57 <sup>s</sup> 57.68	2.2014	N. 25° 53' 18.0"	0.873	0	<sup>h</sup> 8 <sup>m</sup> 41 <sup>s</sup> 17.25	2.0909	N. 22° 54' 26.5"	6.417
1	7 0 9.72	2.2000	25 52 21.9	0.996	1	8 43 22.62	2.0890	22 47 58.4	6.590
2	7 2 21.68	2.1987	25 51 18.4	1.120	2	8 45 27.82	2.0852	22 41 24.1	6.824
3	7 4 33.55	2.1971	25 50 7.5	1.244	3	8 47 32.85	2.0824	22 34 43.6	6.796
4	7 6 45.33	2.1956	25 48 49.2	1.367	4	8 49 37.70	2.0793	22 27 57.0	6.886
5	7 8 57.02	2.1941	25 47 23.5	1.490	5	8 51 42.37	2.0763	22 21 4.3	6.999
6	7 11 8.62	2.1925	25 45 50.4	1.614	6	8 53 46.86	2.0734	22 14 5.5	7.030
7	7 13 20.12	2.1908	25 44 9.9	1.736	7	8 55 51.17	2.0704	22 7 0.7	7.130
8	7 15 31.51	2.1890	25 42 22.1	1.859	8	8 57 55.30	2.0674	21 59 49.9	7.229
9	7 17 42.80	2.1872	25 40 26.9	1.980	9	8 59 59.26	2.0645	21 52 33.2	7.328
10	7 19 53.98	2.1854	25 38 24.5	2.101	10	9 2 3.04	2.0614	21 45 10.6	7.426
11	7 22 5.05	2.1836	25 36 14.8	2.223	11	9 4 6.63	2.0584	21 37 42.1	7.524
12	7 24 16.01	2.1818	25 33 57.8	2.343	12	9 6 10.05	2.0555	21 30 7.7	7.621
13	7 26 26.86	2.1798	25 31 33.6	2.464	13	9 8 13.29	2.0525	21 22 27.6	7.717
14	7 28 37.59	2.1778	25 29 2.1	2.585	14	9 10 16.35	2.0496	21 14 41.7	7.814
15	7 30 48.20	2.1758	25 26 23.4	2.705	15	9 12 19.23	2.0465	21 6 50.0	7.910
16	7 32 58.69	2.1738	25 23 37.5	2.825	16	9 14 21.93	2.0436	20 58 52.6	8.005
17	7 35 9.05	2.1716	25 20 44.4	2.944	17	9 16 24.46	2.0407	20 50 49.5	8.099
18	7 37 19.28	2.1694	25 17 44.2	3.063	18	9 18 26.81	2.0376	20 42 40.8	8.192
19	7 39 29.38	2.1673	25 14 36.9	3.181	19	9 20 28.98	2.0346	20 34 26.5	8.284
20	7 41 39.35	2.1652	25 11 22.5	3.299	20	9 22 30.97	2.0318	20 26 6.7	8.376
21	7 43 49.20	2.1630	25 8 1.0	3.418	21	9 24 32.79	2.0288	20 17 41.4	8.468
22	7 45 58.91	2.1605	25 4 32.4	3.535	22	9 26 34.43	2.0258	20 9 10.6	8.559
23	7 48 8.47	2.1582	N. 25 0 56.8	3.652	23	9 28 35.89	2.0229	N. 20 0 34.3	8.650
THURSDAY 26.					SATURDAY 28.				
0	7 50 17.89	2.1558	N. 24 57 14.2	3.769	0	9 30 37.18	2.0201	N. 19 51 52.6	8.739
1	7 52 27.17	2.1535	24 53 24.6	3.885	1	9 32 38.30	2.0172	19 43 5.6	8.896
2	7 54 36.31	2.1511	24 49 28.1	4.000	2	9 34 39.24	2.0142	19 34 13.3	8.915
3	7 56 45.30	2.1487	24 45 24.7	4.115	3	9 36 40.01	2.0114	19 25 15.8	9.002
4	7 58 54.14	2.1461	24 41 14.4	4.230	4	9 38 40.61	2.0086	19 16 13.1	9.069
5	8 1 2.83	2.1435	24 36 57.2	4.344	5	9 40 41.04	2.0058	19 7 5.2	9.175
6	8 3 11.36	2.1409	24 32 33.2	4.457	6	9 42 41.30	2.0029	18 57 52.1	9.261
7	8 5 19.74	2.1384	24 28 2.4	4.570	7	9 44 41.39	2.0001	18 48 33.9	9.346
8	8 7 27.97	2.1358	24 23 24.8	4.683	8	9 46 41.31	1.9974	18 39 10.6	9.430
9	8 9 36.04	2.1332	24 18 40.5	4.794	9	9 48 41.07	1.9947	18 29 42.3	9.514
10	8 11 43.95	2.1305	24 13 49.5	4.906	10	9 50 40.67	1.9920	18 20 9.0	9.598
11	8 13 51.70	2.1277	24 8 51.8	5.018	11	9 52 40.10	1.9891	18 10 30.8	9.678
12	8 15 59.28	2.1250	24 3 47.4	5.128	12	9 54 39.36	1.9863	18 0 47.7	9.759
13	8 18 6.70	2.1224	23 58 36.4	5.238	13	9 56 38.46	1.9836	17 50 59.7	9.840
14	8 20 13.96	2.1197	23 53 18.8	5.348	14	9 58 37.40	1.9811	17 41 6.9	9.920
15	8 22 21.06	2.1170	23 47 54.6	5.458	15	10 0 36.19	1.9785	17 31 9.3	10.000
16	8 24 27.99	2.1141	23 42 23.8	5.568	16	10 2 34.82	1.9759	17 21 6.9	10.079
17	8 26 34.75	2.1111	23 36 46.5	5.675	17	10 4 33.30	1.9734	17 10 59.8	10.157
18	8 28 41.33	2.1082	23 31 2.8	5.782	18	10 6 31.62	1.9710	17 0 48.1	10.234
19	8 30 47.74	2.1055	23 25 12.7	5.889	19	10 8 29.79	1.9683	16 50 31.8	10.310
20	8 32 53.99	2.1027	23 19 16.2	5.995	20	10 10 27.81	1.9658	16 40 10.9	10.385
21	8 35 0.07	2.0999	23 13 13.3	6.102	21	10 12 25.68	1.9632	16 29 45.5	10.461
22	8 37 5.98	2.0971	23 7 4.0	6.208	22	10 14 23.40	1.9608	16 19 15.6	10.536
23	8 39 11.71	2.0939	23 0 48.4	6.313	23	10 16 20.98	1.9584	16 8 41.2	10.611
24	8 41 17.25	2.0909	N. 22 54 26.5	6.417	24	10 18 18.41	1.9560	N. 15 58 2.3	10.684

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SUNDAY 29.					MONDAY 30.				
0	10 18 18.41	1.9560	N.15° 58' 2.3"	10.684	0	11 4 39.23	1.9099	N.11° 22' 23.7"	12.217
1	10 20 15.70	1.9537	15 47 19.1	10.756	1	11 6 33.78	1.9085	11 10 9.1	12.271
2	10 22 12.85	1.9514	15 36 31.6	10.898	2	11 8 28.25	1.9073	10 57 51.2	12.395
3	10 24 9.87	1.9492	15 25 39.8	10.898	3	11 10 22.65	1.9060	10 45 30.1	12.377
4	10 26 6.75	1.9469	15 14 43.8	10.968	4	11 12 16.97	1.9047	10 33 5.9	12.429
5	10 28 3.49	1.9446	15 3 43.6	11.038	5	11 14 11.21	1.9034	10 20 38.6	12.481
6	10 30 0.10	1.9424	14 52 39.3	11.106	6	11 16 5.38	1.9022	10 8 8.2	12.532
7	10 31 56.58	1.9404	14 41 30.9	11.174	7	11 17 59.48	1.9012	9 55 34.8	12.582
8	10 33 52.94	1.9382	14 30 18.5	11.240	8	11 19 53.52	1.9003	9 42 58.4	12.631
9	10 35 49.17	1.9361	14 19 2.1	11.307	9	11 21 47.50	1.8992	9 30 19.1	12.679
10	10 37 45.28	1.9341	14 7 41.7	11.373	10	11 23 41.42	1.8982	9 17 36.9	12.728
11	10 39 41.27	1.9322	13 56 17.4	11.438	11	11 25 35.28	1.8973	9 4 51.8	12.775
12	10 41 37.14	1.9302	13 44 49.2	11.503	12	11 27 29.08	1.8963	8 52 3.9	12.821
13	10 43 32.89	1.9283	13 33 17.1	11.567	13	11 29 22.83	1.8955	8 39 13.3	12.866
14	10 45 28.53	1.9265	13 21 41.2	11.629	14	11 31 16.54	1.8949	8 26 20.0	12.910
15	10 47 24.07	1.9247	13 10 1.6	11.691	15	11 33 10.21	1.8941	8 13 24.1	12.953
16	10 49 19.49	1.9228	12 58 18.3	11.752	16	11 35 3.83	1.8934	8 0 25.7	12.994
17	10 51 14.80	1.9210	12 46 31.4	11.819	17	11 36 57.41	1.8928	7 47 24.8	13.036
18	10 53 10.01	1.9194	12 34 40.9	11.872	18	11 38 50.96	1.8923	7 34 21.4	13.077
19	10 55 5.12	1.9177	12 22 46.8	11.932	19	11 40 44.48	1.8918	7 21 15.6	13.117
20	10 57 0.13	1.9160	12 10 49.1	11.991	20	11 42 37.97	1.8912	7 8 7.4	13.156
21	10 58 55.04	1.9144	11 58 47.9	12.050	21	11 44 31.43	1.8906	6 54 56.9	13.194
22	11 0 49.86	1.9129	11 46 43.2	12.108	22	11 46 24.87	1.8905	6 41 44.1	13.233
23	11 2 44.59	1.9114	11 34 35.1	12.163	23	11 48 18.29	1.8903	6 28 29.0	13.270
24	11 4 39.23	1.9099	N.11° 22' 23.7"	12.217	24	11 50 11.70	1.8901	N. 6 15 11.7	13.307

PHASES OF THE MOON.

● New Moon,	2	12	53.3
☾ First Quarter,	10	2	3.5
○ Full Moon,	16	17	4.7
☾ Last Quarter,	24	1	21.7

☾ Perigee,	14	16.4
☾ Apogee,	26	13.8

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
5	Sun W.	28° 25' 46"	3220	29° 51' 31"	3206	31° 17' 33"	3182	32° 43' 52"	3178
	Antares E.	57 15 20	2819	55 41 17	2812	54 7 5	2805	52 32 43	2796
	Saturn E.	98 26 5	2800	91 51 37	2792	90 16 58	2783	88 42 8	2775
	α Aquilæ E.	104 2 38	3630	102 44 36	3611	101 26 14	3594	100 7 33	3578
6	Sun W.	39 59 25	3114	41 27 17	2103	42 55 22	3091	44 23 44	3079
	Antares E.	44 38 20	2759	43 2 58	2751	41 27 26	2744	39 51 45	2737
	Saturn E.	80 45 11	2732	79 9 13	2723	77 33 4	2714	75 56 43	2704
	α Aquilæ E.	93 30 4	3510	92 9 51	3500	90 49 27	3490	89 28 52	3482
7	Sun W.	51 49 5	3022	53 18 51	3009	54 48 52	2997	56 19 8	2985
	Spica W.	15 31 38	2934	17 3 14	2880	18 35 59	2833	20 9 44	2794
	Antares E.	31 51 6	2708	30 14 24	2701	28 37 56	2696	27 1 11	2682
	Saturn E.	67 51 51	2658	66 14 15	2649	64 36 26	2639	62 58 24	2629
	α Aquilæ E.	82 43 53	3453	81 22 36	3448	80 1 15	3447	78 39 52	3447
	Fomalhaut E.	114 20 35	2865	112 47 31	2850	111 14 8	2835	109 40 26	2821
8	Sun W.	63 54 10	2927	65 25 55	2914	66 57 56	2901	68 30 13	2890
	Spica W.	28 9 6	2863	29 46 35	2844	31 24 30	2826	33 2 49	2809
	Saturn E.	54 44 52	2580	53 5 29	2569	51 25 51	2559	49 45 59	2548
	α Aquilæ E.	71 53 16	3463	70 32 11	3471	69 11 14	3481	67 50 29	3493
	Fomalhaut E.	101 47 28	2754	100 12 0	2742	98 36 16	2730	97 0 16	2717
	α Pegasi E.	119 9 30	3109	117 41 31	3082	116 13 0	3057	114 43 58	3034
9	Sun W.	76 15 32	2828	77 49 24	2815	79 23 32	2802	80 57 57	2790
	Spica W.	41 20 2	2532	43 0 31	2517	44 41 20	2504	46 22 28	2489
	Saturn E.	41 23 7	2497	39 41 50	2487	38 0 18	2477	36 18 32	2467
	α Aquilæ E.	61 10 45	3586	59 51 55	3613	58 33 35	3645	57 15 49	3680
	Fomalhaut E.	88 56 14	2659	87 18 39	2649	85 40 50	2638	84 2 46	2627
	α Pegasi E.	107 11 42	2927	105 39 57	2908	104 7 48	2890	102 35 16	2873
10	Sun W.	88 54 8	2726	90 30 13	2714	92 6 34	2701	93 43 12	2689
	Spica W.	54 52 57	2423	56 35 59	2410	58 19 20	2397	60 2 59	2384
	α Aquilæ E.	50 57 58	3932	49 45 11	4003	48 33 34	4084	47 23 17	4178
	Fomalhaut E.	75 49 0	2579	74 9 36	2570	72 30 0	2563	70 50 14	2555
	α Pegasi E.	94 47 21	2797	93 12 49	2784	91 38 0	2772	90 2 55	2760
11	Sun W.	101 50 33	2628	103 28 50	2615	105 7 24	2604	106 46 14	2593
	Spica W.	68 45 43	2324	70 31 8	2311	72 16 51	2300	74 2 51	2289
	Antares W.	22 59 4	2382	24 48 4	2360	26 27 36	2339	28 12 39	2321
	Fomalhaut E.	92 29 2	2527	60 48 26	2523	59 7 45	2521	57 27 1	2520
	α Pegasi E.	82 3 55	2712	80 27 31	2705	78 50 58	2699	77 14 17	2695
12	Sun W.	115 4 12	2538	116 44 32	2529	118 25 5	2519	120 5 52	2510
	Spica W.	82 56 54	2235	84 44 30	2225	86 32 20	2215	88 20 25	2206
	Antares W.	37 3 46	2249	38 51 1	2237	40 38 34	2225	42 26 25	2213
	Fomalhaut E.	49 3 36	2538	47 23 15	2548	45 43 8	2559	44 3 17	2573
	α Pegasi E.	69 9 43	2687	67 32 45	2689	65 55 50	2694	64 19 2	2700
	α Arietis E.	110 59 54	2333	109 14 42	2321	107 29 13	2309	105 43 27	2298
13	Sun W.	128 32 47	2471	130 14 41	2464	131 56 45	2459	133 38 56	2453
	Spica W.	97 24 5	2165	99 13 25	2159	101 2 55	2152	102 52 35	2147
	Antares W.	51 29 36	2165	53 18 56	2157	55 8 29	2149	56 58 13	2143
	Fomalhaut E.	25 51 10	2723	34 15 1	2773	32 39 58	2831	31 6 11	2902
	α Pegasi E.	56 18 2	2765	54 42 48	2787	53 8 3	2813	51 33 52	2842

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.		Midnight.	P. L. of Diff.	XV <sup>h</sup> .	P. L. of Diff.	XVIII <sup>h</sup> .	P. L. of Diff.	XXI <sup>h</sup> .	P. L. of Diff.
5	SUN	W.	34 10 26	3164	35 37 20	3152	37 4 27	3139	38 31 49	3128
	Antares	E.	50 58 10	2789	49 23 28	2781	47 48 35	2773	46 13 32	2766
	Saturn	E.	87 7 7	2766	85 31 55	2758	83 56 32	2749	82 20 57	2741
	$\alpha$ Aquilæ	E.	98 48 35	3563	97 29 20	3548	96 9 49	3535	94 50 3	3523
6	SUN	W.	45 52 19	3067	47 21 9	3056	48 50 13	3045	50 19 30	3034
	Antares	E.	38 15 54	2730	36 39 54	2724	35 3 46	2718	33 27 30	2712
	Saturn	E.	74 20 9	2695	72 43 23	2687	71 6 25	2677	69 20 14	2668
	$\alpha$ Aquilæ	E.	88 8 8	3473	86 47 14	3467	85 26 13	3462	84 5 6	3456
7	SUN	W.	57 49 38	2973	59 20 24	2962	60 51 24	2950	62 22 40	2939
	Spica	W.	21 44 20	2769	23 19 38	2733	24 55 34	2707	26 32 4	2684
	Antares	E.	25 24 21	2690	23 47 28	2691	22 10 36	2696	20 33 51	2706
	Saturn	E.	61 20 9	2619	59 41 40	2610	58 2 58	2599	56 24 2	2589
	$\alpha$ Aquilæ	E.	77 18 29	3447	75 57 6	3449	74 35 45	3453	73 14 28	3457
	Fomalhaut	E.	108 6 26	2896	106 32 8	2794	104 57 32	2761	103 22 39	2767
8	SUN	W.	70 2 45	2877	71 35 33	2865	73 8 37	2852	74 41 57	2841
	Spica	W.	34 41 32	2569	36 20 38	2577	38 0 5	2561	39 39 53	2546
	Saturn	E.	48 5 53	2538	46 25 33	2536	44 44 59	2517	43 4 10	2507
	$\alpha$ Aquilæ	E.	66 29 57	3506	65 9 40	3523	63 49 41	3541	62 30 2	3561
	Fomalhaut	E.	95 23 59	2705	93 47 26	2694	92 10 38	2699	90 33 34	2670
	$\alpha$ Pegasi	E.	113 14 27	3009	111 44 26	2968	110 13 58	2996	109 43 3	2946
9	SUN	W.	82 32 38	2777	84 7 36	2765	85 42 50	2752	87 18 21	2740
	Spica	W.	48 3 56	2476	49 45 43	2462	51 27 49	2449	53 10 14	2436
	Saturn	E.	34 36 32	2458	32 54 19	2448	31 11 52	2438	29 29 12	2429
	$\alpha$ Aquilæ	E.	55 58 41	3791	54 42 16	3765	53 26 37	3814	52 11 49	3869
	Fomalhaut	E.	82 24 28	2617	80 45 56	2607	79 7 10	2597	77 28 11	2588
	$\alpha$ Pegasi	E.	101 2 22	2856	99 29 7	2840	97 55 31	2825	96 21 35	2811
10	SUN	W.	95 20 7	2676	96 57 19	2664	98 34 47	2652	100 12 32	2640
	Spica	W.	61 46 56	2372	63 31 11	2359	65 15 44	2347	67 0 35	2335
	$\alpha$ Aquilæ	E.	46 14 30	4279	45 7 18	4390	44 1 48	4516	42 58 10	4660
	Fomalhaut	E.	69 10 17	2548	67 30 10	2542	65 49 55	2536	64 9 32	2531
11	SUN	W.	108 25 19	2581	110 4 40	2570	111 44 16	2560	113 24 6	2548
	Spica	W.	75 49 7	2277	77 35 40	2266	79 22 29	2256	81 9 34	2245
	Antares	W.	29 58 8	2305	31 44 0	2289	33 30 15	2275	35 16 51	2262
	Fomalhaut	E.	55 46 15	2590	54 5 29	2581	52 24 45	2565	50 44 7	2550
12	SUN	W.	121 46 52	2561	123 28 4	2492	125 9 28	2485	126 51 3	2478
	Spica	W.	90 8 44	2197	91 57 16	2189	93 46 0	2180	95 34 57	2173
	Antares	W.	44 14 33	2292	46 2 57	2192	47 51 36	2183	49 40 29	2174
	Fomalhaut	E.	42 23 45	2592	40 44 39	2616	39 6 6	2646	37 28 14	2669
13	SUN	W.	135 21 15	2449	137 3 42	2446	138 46 9	2443	140 28 43	2441
	Spica	W.	104 42 23	2141	106 32 20	2136	108 22 24	2132	110 12 35	2128
	Antares	W.	58 48 7	2136	60 38 11	2130	62 28 24	2125	64 18 45	2120
	Fomalhaut	E.	29 33 55	2968	28 3 27	3006	26 35 15	3231	25 9 43	3412
	$\alpha$ Pegasi	E.	50 0 19	2875	48 27 28	2915	46 55 28	2962	45 24 27	3013

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.		Noon.	P. L. of Diff.	III <sup>h</sup> .	P. L. of Diff.	VI <sup>h</sup> .	P. L. of Diff.	IX <sup>h</sup> .	P. L. of Diff.
13	$\alpha$ Arietis	E.	96° 50' 44"	2250	95° 3' 31"	2242	93° 16' 6"	2235	91° 28' 31"	2229
14	Antares	W.	66 9 14	2116	67 59 49	2112	69 50 30	2109	71 41 16	2107
	Saturn	W.	30 3 42	2124	31 54 4	2119	33 44 34	2114	35 35 12	2110
	$\alpha$ Pegasi	E.	43 54 30	3073	42 25 48	3143	40 58 31	3220	39 32 45	3310
	$\alpha$ Arietis	E.	82 28 32	2207	80 40 15	2205	78 51 55	2203	77 3 32	2203
	Aldebaran	E.	112 57 11	2124	111 6 49	2120	109 16 21	2117	107 25 48	2115
15	Antares	W.	80 55 42	2103	82 46 36	2104	84 37 29	2106	86 28 19	2109
	Saturn	W.	44 49 28	2102	46 40 24	2103	48 31 19	2104	50 22 12	2106
	$\alpha$ Aquilæ	W.	44 20 4	4104	45 30 2	3977	46 42 4	3867	47 55 57	3768
	$\alpha$ Arietis	E.	68 1 53	2213	66 13 45	2218	64 25 44	2224	62 37 52	2231
	Aldebaran	E.	98 12 24	2111	96 21 42	2113	94 31 2	2115	92 40 25	2116
16	Antares	W.	95 41 9	2131	97 31 21	2138	99 21 22	2145	101 11 13	2152
	Saturn	W.	59 35 29	2126	61 25 48	2133	63 15 57	2139	65 5 57	2147
	$\alpha$ Aquilæ	W.	54 28 25	3408	55 50 33	3359	57 13 36	3315	58 37 30	3277
	$\alpha$ Arietis	E.	53 41 44	2284	51 55 21	2299	50 9 20	2315	48 23 43	2334
	Aldebaran	E.	83 28 36	2139	81 38 37	2146	79 48 48	2153	77 59 10	2161
17	Saturn	W.	74 12 50	2192	76 1 30	2203	77 49 53	2214	79 37 59	2226
	$\alpha$ Aquilæ	W.	65 46 28	3151	67 13 36	3136	68 41 2	3124	70 8 43	3115
	Fomalhaut	W.	30 43 57	2891	32 16 28	2847	33 49 55	2802	35 24 20	2763
	$\alpha$ Arietis	E.	39 43 15	2459	38 1 4	2492	36 19 40	2530	34 39 9	2573
	Aldebaran	E.	68 54 14	2209	67 6 0	2221	65 18 4	2233	63 30 26	2245
	Pollux	E.	112 59 47	2192	111 11 8	2203	109 22 45	2214	107 34 39	2226
18	Saturn	W.	88 33 52	2293	90 20 2	2307	92 5 51	2322	93 51 18	2337
	$\alpha$ Aquilæ	W.	77 28 44	3108	78 56 44	3113	80 24 38	3119	81 52 25	3137
	Fomalhaut	W.	43 26 21	2659	45 3 56	2651	46 41 42	2646	48 19 35	2643
	$\alpha$ Pegasi	W.	31 32 57	4262	32 40 25	4089	33 50 37	3948	35 3 14	3819
	Aldebaran	E.	54 37 13	2318	52 51 40	2334	51 6 30	2351	49 21 45	2368
	Pollux	E.	98 38 44	2292	96 52 33	2307	95 6 43	2321	93 21 14	2337
19	Saturn	W.	102 32 53	2419	104 16 1	2436	105 58 45	2453	107 41 5	2470
	$\alpha$ Aquilæ	W.	89 8 10	3192	90 34 20	3209	92 0 27	3228	93 26 3	3247
	Fomalhaut	W.	56 28 54	2660	58 6 28	2668	59 43 51	2676	61 21 3	2685
	$\alpha$ Pegasi	W.	41 32 52	3429	42 54 36	3380	44 17 15	3338	45 40 42	3305
	Aldebaran	E.	40 44 22	2462	39 2 15	2453	37 20 38	2504	35 39 31	2537
	Pollux	E.	84 39 31	2417	82 56 20	2433	81 13 33	2450	79 31 10	2467
	Mars	E.	112 49 58	2622	111 11 33	2640	109 33 32	2657	107 55 55	2675
	Jupiter	E.	113 55 33	2487	112 14 2	2504	110 32 54	2520	108 52 9	2538
20	$\alpha$ Aquilæ	W.	100 27 44	3367	101 50 38	3395	103 13 0	3423	104 34 50	3454
	Fomalhaut	W.	69 23 31	2744	70 59 12	2758	72 34 35	2779	74 9 39	2796
	$\alpha$ Pegasi	W.	52 45 45	3207	54 11 46	3198	55 37 58	3189	57 4 20	3184
	Pollux	E.	71 5 20	2555	69 25 27	2573	67 45 50	2590	66 6 41	2608
	Mars	E.	99 53 46	2766	98 18 33	2763	96 43 43	2801	95 9 17	2819
	Jupiter	E.	100 34 23	2625	98 56 2	2642	97 18 4	2660	95 40 30	2678
	Sun	E.	136 58 52	2911	135 26 47	2928	133 55 4	2946	132 23 43	2963
21	Fomalhaut	W.	82 0 15	2863	83 33 23	2877	85 6 11	2893	86 38 39	2908
	$\alpha$ Pegasi	W.	64 16 51	3186	65 43 17	3191	67 9 37	3195	68 35 52	3201
	$\alpha$ Arietis	W.	21 2 29	3591	22 21 13	3490	23 41 48	3412	25 3 51	3350
	Pollux	E.	57 56 56	2695	56 20 9	2711	54 43 44	2729	53 7 42	2745

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Dist.	XVh.	P. L. of Dist.	XVIh.	P. L. of Dist.	XXIh.	P. L. of Dist.
13	$\alpha$ Arietis E.	89 40 46	2223	87 52 53	2218	86 4 52	2214	84 16 45	2210
14	Antares W.	73 32 5	2104	75 22 58	2103	77 13 52	2103	79 4 47	2103
	Saturn W.	37 25 56	2107	39 16 45	2105	41 7 37	2103	42 58 32	2102
	$\alpha$ Pegasi E.	38 8 39	2409	36 46 25	2511	35 26 13	2636	34 8 18	2792
	$\alpha$ Arietis E.	75 15 9	2203	73 26 46	2204	71 38 25	2206	69 50 7	2209
	Aldebaran E.	105 35 12	2113	103 44 32	2111	101 53 50	2111	100 3 7	2111
15	Antares W.	88 19 4	2112	90 9 45	2116	92 0 20	2120	93 50 48	2125
	Saturn W.	52 13 2	2109	54 3 48	2113	55 54 28	2116	57 45 2	2121
	$\alpha$ Aquilæ W.	49 11 32	2677	50 28 43	2597	51 47 21	2525	53 7 18	2462
	$\alpha$ Arietis E.	60 50 11	2239	59 2 42	2249	57 15 26	2259	55 28 26	2271
	Aldebaran E.	90 49 51	2120	88 59 23	2124	87 9 0	2128	85 18 44	2134
16	Antares W.	103 0 53	2161	104 50 20	2170	106 39 33	2179	108 28 32	2188
	Saturn W.	66 55 45	2155	68 45 21	2163	70 34 45	2172	72 23 55	2182
	$\alpha$ Aquilæ W.	60 2 8	2343	61 27 26	2314	62 53 18	2189	64 19 40	2168
	$\alpha$ Arietis E.	46 38 33	2254	44 53 52	2276	43 9 43	2401	41 26 9	2429
	Aldebaran E.	76 9 43	2169	74 20 29	2178	72 31 29	2188	70 42 44	2198
17	Saturn W.	81 25 48	2239	83 13 18	2251	85 0 29	2264	86 47 21	2279
	$\alpha$ Aquilæ W.	71 36 34	2110	73 4 32	2105	74 32 35	2104	76 0 40	2105
	Fomalhaut W.	36 59 26	2732	38 35 24	2704	40 11 58	2684	41 48 59	2669
	$\alpha$ Arietis E.	32 59 37	2221	31 21 11	2277	29 44 0	2740	28 8 13	2212
	Aldebaran E.	61 43 6	2259	59 56 6	2273	58 9 27	2287	56 23 9	2302
	Pollux E.	105 46 50	2239	103 59 20	2251	102 12 8	2264	100 25 16	2278
18	Saturn W.	95 36 23	2253	97 21 5	2268	99 5 25	2285	100 49 21	2402
	$\alpha$ Aquilæ W.	83 20 2	2138	84 47 26	2148	86 14 37	2162	87 41 32	2176
	Fomalhaut W.	49 57 31	2643	51 35 27	2645	53 13 21	2648	54 51 11	2653
	$\alpha$ Pegasi W.	36 17 56	2714	37 34 29	2694	38 52 37	2548	40 12 8	2482
	Aldebaran E.	47 37 24	2285	45 53 28	2404	44 9 59	2423	42 26 57	2442
	Pollux E.	91 36 8	2268	89 51 24	2268	88 7 3	2284	86 23 5	2401
19	Saturn W.	109 23 1	2487	111 4 32	2504	112 45 39	2522	114 26 21	2540
	$\alpha$ Aquilæ W.	94 51 16	2269	96 16 4	2292	97 40 25	2315	99 4 19	2340
	Fomalhaut W.	62 58 3	2696	64 34 48	2707	66 11 18	2719	67 47 33	2732
	$\alpha$ Pegasi W.	47 4 48	2278	48 29 25	2255	49 54 29	2235	51 19 57	2218
	Aldebaran E.	33 58 55	2250	32 18 51	2274	30 39 21	2200	29 0 26	2226
	Pollux E.	77 49 11	2485	76 7 37	2502	74 26 27	2520	72 45 41	2538
	Mars E.	106 18 41	2293	104 41 52	2710	103 5 26	2729	101 29 24	2747
	Jupiter E.	107 11 48	2255	105 31 51	2572	103 52 18	2590	102 13 9	2607
20	$\alpha$ Aquilæ W.	105 56 5	2486	107 16 45	2518	108 36 49	2554	109 56 14	2592
	Fomalhaut W.	75 44 25	2201	77 18 52	2216	78 52 59	2231	80 26 47	2246
	$\alpha$ Pegasi W.	58 30 48	2183	59 57 18	2181	61 23 50	2182	62 50 21	2183
	Pollux E.	64 27 57	2225	62 49 36	2243	61 11 39	2260	59 34 6	2278
	Mars E.	98 35 14	2238	92 1 35	2256	90 28 20	2274	88 55 28	2291
	Jupiter E.	94 3 20	2225	92 26 33	2713	90 50 10	2729	89 14 9	2747
	Sun E.	130 52 44	2221	129 22 7	2226	127 51 52	2215	126 21 58	2203
21	Fomalhaut W.	88 10 48	2294	89 42 36	2240	91 14 4	2255	92 45 13	2271
	$\alpha$ Pegasi W.	70 2 0	2209	71 27 59	2215	72 53 50	2224	74 19 31	2232
	$\alpha$ Arietis W.	26 27 5	2300	27 51 16	2262	29 16 12	2321	30 41 45	2306
	Pollux E.	51 32 2	2761	49 56 43	2778	48 21 46	2794	46 47 10	2810



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.		Noon.	P. L. of Diff.	III <sup>b</sup> .	P. L. of Diff.	VI <sup>b</sup> .	P. L. of Diff.	IX <sup>b</sup> .	P. L. of Diff.
21	Mars	E.	87° 22' 58"	2909	85° 50' 51"	2927	84° 19' 7"	2944	82° 47' 44"	2968
	Jupiter	E.	87 38 32	2764	86 3 17	2782	84 28 25	2798	82 53 55	2814
	SUN	E.	124 52 26	3051	123 23 16	3068	121 54 27	3085	120 25 59	3101
22	Fomalhaut	W.	94 16 2	2987	95 46 31	3002	97 16 41	3018	98 46 32	3034
	α Pegasi	W.	75 45 2	3242	77 10 22	3250	78 35 32	3260	80 0 30	3270
	α Arietis	W.	32 7 47	3187	33 34 12	3173	35 0 55	3161	36 27 51	3152
	Pollux	E.	45 12 55	2825	43 39 0	2840	42 5 24	2855	40 32 8	2871
	Jupiter	E.	75 6 37	2894	73 34 10	2909	72 2 2	2924	70 30 13	2937
	Mars	E.	75 16 8	3043	73 46 49	3060	72 17 50	3074	70 49 9	3089
	SUN	E.	113 8 42	3183	111 42 13	3199	110 16 3	3214	108 50 11	3230
23	α Pegasi	W.	87 2 21	3324	88 26 5	3334	89 49 37	3345	91 12 56	3357
	α Arietis	W.	43 44 20	3137	45 11 45	3137	46 39 10	3138	48 6 33	3140
	Pollux	E.	32 50 30	2942	31 19 4	2955	29 47 55	2969	28 17 3	2982
	Jupiter	E.	62 55 29	3005	61 25 22	3017	59 55 30	3029	58 25 53	3040
	Mars	E.	63 30 7	3158	62 3 7	3171	60 36 23	3183	59 9 53	3194
	Regulus	E.	69 3 38	2936	67 32 5	2948	66 0 47	2966	64 29 44	2971
	SUN	E.	101 45 4	3298	100 20 50	3310	98 56 50	3323	97 33 5	3335
24	α Arietis	W.	55 22 49	3153	56 49 54	3157	58 16 55	3159	59 43 53	3163
	Aldebaran	W.	24 17 49	3123	25 45 31	3118	27 13 19	3115	28 41 10	3114
	Jupiter	E.	51 1 11	3091	49 32 51	3101	48 4 43	3110	46 36 45	3119
	Mars	E.	52 0 44	3247	50 35 31	3256	49 10 28	3265	47 45 36	3273
	Regulus	E.	56 57 50	3022	55 28 4	3030	53 58 29	3039	52 29 5	3047
	SUN	E.	90 37 30	3386	89 14 57	3395	87 52 35	3403	86 30 22	3410
25	α Arietis	W.	66 57 52	3175	68 24 31	3177	69 51 8	3178	71 17 43	3179
	Aldebaran	W.	36 0 41	3113	37 28 35	3114	38 56 28	3114	40 24 21	3114
	Jupiter	E.	39 19 21	3155	37 52 18	3162	36 25 23	3166	34 58 35	3173
	Mars	E.	40 43 30	3309	39 19 29	3314	37 55 34	3320	36 31 46	3326
	Regulus	E.	45 4 21	3082	43 35 49	3088	42 7 25	3093	40 39 7	3099
	SUN	E.	79 41 16	3443	78 19 48	3447	76 58 25	3452	75 37 7	3455
26	α Arietis	W.	78 30 22	3183	79 56 52	3189	81 23 23	3189	82 49 54	3189
	Aldebaran	W.	47 43 42	3113	49 11 36	3119	50 39 31	3110	52 7 28	3110
	Jupiter	E.	27 46 22	3204	26 20 17	3211	24 54 21	3220	23 28 34	3226
	Mars	E.	29 34 13	3348	28 10 57	3352	26 47 46	3358	25 24 41	3363
	Regulus	E.	33 19 12	3194	31 51 31	3198	30 23 55	3133	28 56 25	3138
	SUN	E.	68 51 29	3467	67 30 28	3469	66 9 29	3469	64 48 30	3469
27	α Arietis	W.	90 2 57	3172	91 29 40	3168	92 56 27	3166	94 23 17	3163
	Aldebaran	W.	59 27 48	3096	60 56 2	3092	62 24 21	3089	63 52 44	3085
	Pollux	W.	15 21 7	3147	16 48 20	3133	18 15 49	3120	19 43 34	3110
	SUN	E.	58 3 27	3463	56 42 21	3460	55 21 12	3457	54 0 0	3454
28	α Arietis	W.	101 38 29	3144	103 5 45	3139	104 33 7	3135	106 0 34	3130
	Aldebaran	W.	71 16 4	3059	72 45 4	3053	74 14 11	3047	75 43 26	3041
	Pollux	W.	27 5 24	3064	28 34 18	3055	30 3 23	3047	31 32 37	3039
	SUN	E.	47 12 57	3433	45 51 18	3428	44 29 33	3423	43 7 42	3417
29	Aldebaran	W.	83 11 44	3005	84 41 51	2997	86 12 8	2989	87 42 35	2981
	Pollux	W.	39 1 20	2997	40 31 36	2989	42 2 3	2981	43 32 40	2971
	SUN	E.	36 16 50	3387	34 54 19	3382	33 31 42	3376	32 8 58	3370

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
21	Mars E.	81° 16' 43"	2979	79° 46' 4"	2995	78° 15' 45"	3019	76° 45' 47"	3087
	Jupiter E.	81 19 45	2931	79 45 57	2947	78 12 30	2993	76 39 23	2979
	SUN E.	118 57 51	3119	117 30 4	3135	116 2 37	3159	114 35 30	3168
22	Fomalhaut W.	100 16 3	3049	101 45 15	3064	103 14 9	3079	104 42 44	3084
	α Pegasi W.	81 25 17	3081	82 49 51	3091	84 14 13	3301	85 38 23	3312
	α Arietis W.	37 54 58	3146	39 22 12	3141	40 49 32	3138	42 16 55	3137
	Pollux E.	38 59 12	2985	37 26 34	2900	35 54 15	2914	34 22 14	2997
	Jupiter E.	68 58 41	2951	67 27 27	2985	65 56 31	2978	64 25 51	2993
	Mars E.	69 20 46	3104	67 52 41	3118	66 24 53	3139	64 57 22	3145
	SUN E.	107 24 37	3244	105 59 20	3258	104 34 19	3271	103 9 34	3284
23	α Pegasi W.	92 36 2	3368	93 58 55	3380	95 21 34	3392	96 44 0	3403
	α Arietis W.	49 33 54	3143	51 1 12	3144	52 28 28	3148	53 55 40	3150
	Pollux E.	26 46 28	2996	25 16 10	3009	23 46 9	3024	22 16 26	3039
	Jupiter E.	56 56 30	3059	55 27 21	3062	53 58 25	3073	52 29 42	3082
	Mars E.	57 43 37	3206	56 17 35	3217	54 51 46	3227	53 26 9	3237
	Regulus E.	62 58 55	2981	61 28 19	2993	59 57 57	3009	58 27 47	3013
	SUN E.	96 9 34	3345	94 46 15	3357	93 23 9	3366	92 0 14	3376
24	α Arietis W.	61 10 47	3165	62 37 38	3168	64 4 25	3170	65 31 10	3173
	Aldebaran W.	30 9 3	3113	31 36 57	3112	33 4 52	3112	34 32 47	3113
	Jupiter E.	45 8 58	3126	43 41 20	3134	42 13 52	3141	40 46 32	3148
	Mars E.	46 20 53	3292	44 56 20	3298	43 31 55	3296	42 7 39	3302
	Regulus E.	50 59 50	3054	49 30 44	3062	48 1 48	3069	46 33 0	3076
	SUN E.	85 8 17	3418	83 46 21	3424	82 24 32	3431	81 2 51	3437
25	α Arietis W.	72 44 17	3180	74 10 50	3182	75 37 21	3182	77 3 52	3183
	Aldebaran W.	41 52 13	3114	43 20 5	3114	44 47 57	3114	46 15 49	3114
	Jupiter E.	33 31 54	3179	32 5 20	3186	30 38 54	3191	29 12 34	3196
	Mars E.	35 8 5	3331	33 44 29	3335	32 20 58	3340	30 57 33	3345
	Regulus E.	39 10 56	3104	37 42 51	3109	36 14 52	3114	34 46 59	3119
	SUN E.	74 15 53	3459	72 54 43	3462	71 33 36	3463	70 12 31	3466
26	α Arietis W.	84 16 27	3178	85 43 2	3178	87 9 38	3176	88 36 16	3173
	Aldebaran W.	53 35 26	3107	55 3 27	3105	56 31 31	3102	57 59 38	3100
	Jupiter E.	22 2 59	3238	20 37 35	3251	19 12 26	3266	17 47 35	3282
	Mars E.	24 1 42	3368	22 38 49	3374	21 16 3	3382	19 53 26	3391
	Regulus E.	27 29 2	3144	26 1 46	3151	24 34 38	3158	23 7 39	3166
	SUN E.	63 27 31	3469	62 6 32	3468	60 45 32	3466	59 24 30	3465
27	α Arietis W.	95 50 11	3159	97 17 9	3156	98 44 11	3152	100 11 18	3148
	Aldebaran W.	65 21 12	3080	66 49 46	3076	68 18 25	3070	69 47 11	3065
	Pollux W.	21 11 32	3099	22 39 43	3089	24 8 6	3080	25 36 40	3079
	SUN E.	52 38 44	3450	51 17 24	3446	49 56 0	3442	48 34 31	3438
28	α Arietis W.	107 28 7	3125	108 55 46	3121	110 23 30	3116	111 51 20	3112
	Aldebaran W.	77 12 48	3034	78 42 19	3027	80 11 58	3020	81 41 46	3012
	Pollux W.	33 2 2	3031	34 31 36	3022	36 1 21	3015	37 31 15	3006
	SUN E.	41 45 45	3411	40 23 41	3406	39 1 31	3400	37 39 14	3393
29	Aldebaran W.	89 13 12	2972	90 44 0	2964	92 14 58	2955	93 46 7	2946
	Pollux W.	45 3 29	2982	46 34 29	2954	48 5 40	2944	49 37 3	2935
	SUN E.	30 46 7	3364	29 23 9	3353	28 0 4	3359	26 36 53	3348

## AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S						Sidereal Time of the Semi-diameter passing the Meridian.	Equation of Time, to be subtracted from Apparent Time.	Diff. for 1 hour.
		Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Semi-diameter.				
Tues.	1	<sup>h</sup> 12 <sup>m</sup> 31 <sup>s</sup> 34.42	<sup>s</sup> 9.067	S. <sup>°</sup> 3 <sup>'</sup> 24 <sup>"</sup> 36.2	<sup>"</sup> 58.25	<sup>'</sup> 16 <sup>"</sup> 1.64	<sup>h</sup> 64.38	<sup>m</sup> 10 <sup>s</sup> 29.76	<sup>s</sup> 0.787	
Wed.	2	12 35 12.20	9.080	3 47 53.2	58.15	16 1.92	64.43	10 48.48	0.774	
Thur.	3	12 38 50.30	9.094	4 11 7.6	58.04	16 2.20	64.48	11 6.88	0.760	
Frid.	4	12 42 28.74	9.109	4 34 19.0	57.90	16 2.48	64.53	11 24.95	0.745	
Sat.	5	12 46 7.53	9.124	4 57 27.1	57.76	16 2.76	64.59	11 42.66	0.730	
Sun.	6	12 49 46.69	9.140	5 20 31.5	57.59	16 3.04	64.65	12 0.00	0.714	
Mon.	7	12 53 26.24	9.156	5 43 31.5	57.41	16 3.32	64.70	12 16.96	0.698	
Tues.	8	12 57 6.20	9.173	6 6 27.1	57.22	16 3.60	64.77	12 33.50	0.681	
Wed.	9	13 0 46.59	9.191	6 29 17.8	57.00	16 3.89	64.84	12 49.62	0.663	
Thur.	10	13 4 27.42	9.211	6 52 3.3	56.77	16 4.17	64.91	13 5.31	0.643	
Frid.	11	13 8 8.71	9.231	7 14 43.0	56.53	16 4.46	64.98	13 20.52	0.623	
Sat.	12	13 11 50.49	9.252	7 37 16.7	56.27	16 4.74	65.05	13 35.24	0.602	
Sun.	13	13 15 32.77	9.272	7 59 43.9	55.99	16 5.02	65.13	13 49.48	0.582	
Mon.	14	13 19 15.56	9.294	8 22 4.4	55.71	16 5.30	65.21	14 3.20	0.560	
Tues.	15	13 22 58.91	9.317	8 44 17.8	55.40	16 5.58	65.29	14 16.37	0.537	
Wed.	16	13 26 42.83	9.341	9 6 23.7	55.06	16 5.85	65.38	14 28.96	0.513	
Thur.	17	13 30 27.33	9.365	9 28 21.7	54.74	16 6.12	65.47	14 40.98	0.489	
Frid.	18	13 34 12.44	9.392	9 50 11.4	54.40	16 6.39	65.56	14 52.40	0.462	
Sat.	19	13 37 58.18	9.419	10 11 52.5	54.03	16 6.65	65.65	15 3.19	0.435	
Sun.	20	13 41 44.57	9.447	10 33 24.8	53.66	16 6.92	65.74	15 13.34	0.407	
Mon.	21	13 45 31.62	9.475	10 54 47.9	53.26	16 7.18	65.84	15 22.82	0.379	
Tues.	22	13 49 19.36	9.504	11 16 1.3	52.86	16 7.44	65.94	15 31.62	0.350	
Wed.	23	13 53 7.80	9.534	11 37 4.5	52.40	16 7.70	66.04	15 39.71	0.321	
Thur.	24	13 56 56.96	9.564	11 57 57.4	51.97	16 7.97	66.14	15 47.08	0.291	
Frid.	25	14 0 46.85	9.593	12 18 39.4	51.51	16 8.22	66.25	15 53.73	0.262	
Sat.	26	14 4 37.48	9.623	12 39 10.0	51.04	16 8.48	66.35	15 59.64	0.230	
Sun.	27	14 8 28.88	9.657	12 59 29.2	50.53	16 8.73	66.46	16 4.79	0.198	
Mon.	28	14 12 21.04	9.689	13 19 36.2	50.02	16 8.98	66.57	16 9.16	0.166	
Tues.	29	14 16 13.97	9.722	13 39 30.7	49.50	16 9.23	66.68	16 12.77	0.133	
Wed.	30	14 20 7.68	9.755	13 59 12.2	48.95	16 9.48	66.79	16 15.60	0.100	
Thur.	31	14 24 2.19	9.788	14 18 40.5	48.38	16 9.73	66.91	16 17.64	0.067	
Frid.	32	14 27 57.52	9.821	S. 14 37 54.9	47.80	16 9.98	67.02	16 18.87	0.034	

NOTE.—Mean Time of the Semidiameter passing may be found by subtracting 0.18 from the Sidereal Time.

## AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time, to be added to Mean Time.	Diff. for 1 hour.	Sidereal Time or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.			
Tues.	1	<sup>h</sup> 12 <sup>m</sup> 31 <sup>s</sup> 36.00	9.069	S. <sup>°</sup> 3 <sup>'</sup> 24 <sup>"</sup> 46.3	58.26	<sup>m</sup> 10 <sup>s</sup> 29.90	0.787	<sup>h</sup> 12 <sup>m</sup> 42 <sup>s</sup> 5.90
Wed.	2	12 35 13.83	9.082	3 48 3.6	58.16	10 48.62	0.774	12 46 2.45
Thur.	3	12 38 51.98	9.096	4 11 18.3	58.05	11 7.02	0.760	12 49 59.00
Frid.	4	12 42 30.47	9.111	4 34 30.0	57.91	11 25.09	0.745	12 53 55.56
Sat.	5	12 46 9.31	9.126	4 57 38.4	57.77	11 42.80	0.730	12 57 52.11
Sun.	6	12 49 48.52	9.142	5 20 43.0	57.60	12 0.14	0.714	13 1 48.66
Mon.	7	12 53 28.12	9.158	5 43 43.3	57.42	12 17.10	0.698	13 5 45.22
Tues.	8	12 57 8.13	9.175	6 6 39.1	57.23	12 33.64	0.681	13 9 41.77
Wed.	9	13 0 48.56	9.193	6 29 30.0	57.01	12 49.76	0.663	13 13 38.32
Thur.	10	13 4 29.43	9.213	6 52 15.6	56.78	13 5.45	0.643	13 17 34.88
Frid.	11	13 8 10.77	9.233	7 14 55.5	56.54	13 20.66	0.623	13 21 31.43
Sat.	12	13 11 52.59	9.254	7 37 29.4	56.28	13 35.39	0.602	13 25 27.98
Sun.	13	13 15 34.91	9.274	7 59 56.8	56.00	13 49.63	0.582	13 29 24.54
Mon.	14	13 19 17.74	9.296	8 22 17.4	55.72	14 3.35	0.560	13 33 21.09
Tues.	15	13 23 1.13	9.319	8 44 30.9	55.41	14 16.52	0.537	13 37 17.65
Wed.	16	13 26 45.09	9.343	9 6 37.0	55.07	14 29.10	0.513	13 41 14.20
Thur.	17	13 30 29.63	9.367	9 28 35.1	54.74	14 41.12	0.489	13 45 10.75
Frid.	18	13 34 14.77	9.394	9 50 24.9	54.40	14 52.54	0.462	13 49 7.31
Sat.	19	13 38 0.54	9.421	10 12 6.1	54.03	15 3.32	0.435	13 53 3.86
Sun.	20	13 41 46.96	9.449	10 33 38.4	53.66	15 13.46	0.407	13 57 0.42
Mon.	21	13 45 34.04	9.477	10 55 1.5	53.26	15 22.93	0.379	14 0 56.97
Tues.	22	13 49 21.81	9.506	11 16 15.0	52.86	15 31.71	0.350	14 4 53.52
Wed.	23	13 53 10.29	9.535	11 37 18.2	52.40	15 39.79	0.321	14 8 50.08
Thur.	24	13 56 59.48	9.565	11 58 11.1	51.97	15 47.15	0.291	14 12 46.63
Frid.	25	14 0 49.39	9.594	12 18 53.0	51.51	15 53.80	0.262	14 16 43.19
Sat.	26	14 4 40.04	9.626	12 39 23.6	51.04	15 59.70	0.230	14 20 39.74
Sun.	27	14 8 31.46	9.658	12 59 42.7	50.53	16 4.84	0.198	14 24 36.30
Mon.	28	14 12 23.64	9.690	13 19 49.6	50.02	16 9.21	0.166	14 28 32.85
Tues.	29	14 16 16.59	9.723	13 39 44.0	49.50	16 12.82	0.133	14 32 29.41
Wed.	30	14 20 10.32	9.756	13 59 25.5	48.95	16 15.64	0.100	14 36 25.96
Thur.	31	14 24 4.85	9.789	14 18 53.6	48.38	16 17.67	0.067	14 40 22.52
Frid.	32	14 28 0.19	9.823	S. 14 38 7.9	47.80	16 18.88	0.034	14 44 19.07

NOTE.—The Semidiameter for Mean Noon may be assumed the same as that for Apparent Noon.

Diff. for 1 hour  
+9<sup>s</sup>.8565

AT GREENWICH MEAN NOON.											
Day of the Month.	Day of the Year.	THE SUN'S					Logarithm of the Radius Vector of the Earth.	Diff. for 1 hour.	Mean Time of Sidereal Oh.		
		True LONGITUDE.		Diff. for 1 hour.	LATITUDE.						
		$\lambda$	$\lambda'$								
1	275	188° 36' 24.8	36' 3.2	147.77	+0.58	0.0001613	-51.9	11 <sup>h</sup> 16 <sup>m</sup> 3.04 <sup>s</sup>			
2	276	189 35 32.5	35 10.8	147.86	0.51	0.0000364	52.1	11 12 7.14			
3	277	190 34 42.4	34 20.6	147.95	0.42	9.9999108	52.4	11 8 11.23			
4	278	191 33 54.2	33 32.3	148.03	0.30	.9997846	52.7	11 4 15.32			
5	279	192 33 7.9	32 45.9	148.11	0.17	.9996578	53.0	11 0 19.41			
6	280	193 32 23.5	32 1.3	148.19	+0.03	.9995305	53.2	10 56 23.50			
7	281	194 31 40.9	31 18.6	148.26	-0.09	.9994029	53.3	10 52 27.59			
8	282	195 31 0.1	30 37.7	148.34	0.22	.9992752	53.3	10 48 31.68			
9	283	196 30 21.1	29 58.6	148.41	0.32	.9991475	53.2	10 44 35.78			
10	284	197 29 43.8	29 21.2	148.49	0.41	.9990200	53.1	10 40 39.88			
11	285	198 29 8.3	28 45.6	148.56	0.47	.9988928	52.9	10 36 43.97			
12	286	199 28 34.6	28 11.8	148.64	0.52	.9987661	52.7	10 32 48.06			
13	287	200 28 2.6	27 39.7	148.71	0.53	.9986400	52.4	10 28 52.15			
14	288	201 27 32.4	27 9.4	148.79	0.52	.9985146	52.1	10 24 56.24			
15	289	202 27 4.2	26 41.1	148.87	0.47	.9983901	51.7	10 21 0.33			
16	290	203 26 37.9	26 14.7	148.95	0.38	.9982666	51.3	10 17 4.42			
17	291	204 26 13.6	25 50.2	149.03	0.28	.9981441	50.8	10 13 8.51			
18	292	205 25 51.3	25 27.8	149.11	0.15	.9980226	50.4	10 9 12.62			
19	293	206 25 31.0	25 7.4	149.20	-0.02	.9979022	49.9	10 5 16.71			
20	294	207 25 12.9	24 49.2	149.29	+0.12	.9977830	49.5	10 1 20.80			
21	295	208 24 57.0	24 33.2	149.38	0.25	.9976646	49.0	9 57 24.89			
22	296	209 24 43.4	24 19.5	149.47	0.36	.9975477	48.6	9 53 28.96			
23	297	210 24 32.0	24 8.0	149.57	0.45	.9974313	48.3	9 49 33.07			
24	298	211 24 22.8	23 58.7	149.66	0.53	.9973158	48.1	9 45 37.16			
25	299	212 24 15.8	23 51.5	149.76	0.59	.9972012	47.6	9 41 41.25			
26	300	213 24 11.1	23 46.7	149.85	0.61	.9970872	47.4	9 37 45.34			
27	301	214 24 8.5	23 43.9	149.94	0.61	.9969737	47.2	9 33 49.43			
28	302	215 24 8.0	23 43.3	150.03	0.58	.9968607	47.0	9 29 53.52			
29	303	216 24 9.6	23 44.8	150.11	0.51	.9967482	46.8	9 25 57.61			
30	304	217 24 13.3	23 48.4	150.20	0.42	.9966360	46.7	9 22 1.71			
31	305	218 24 19.1	23 54.0	150.28	0.32	.9965242	46.5	9 18 5.80			
32	306	219 24 26.8	24 1.6	150.36	+0.19	9.9964128	-46.3	9 14 9.89			
NOTE: $\lambda$ corresponds to the true equinox of the date, $\lambda'$ to the mean equinox of January 0d.								Diff. for 1 hour -9".8206			

## GREENWICH MEAN TIME.

## THE MOON'S

Day of the Month.	SEMI-DIAMETER.		HORIZONTAL PARALLAX.				MERIDIAN PASSAGE.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 hour.	Midnight.	Diff. for 1 hour.		Diff. for 1 hour.	Noon.
							<sup>h</sup> <sup>m</sup>	<sup>m</sup>	<sup>d</sup>
1	15 7.3	15 11.2	55 23.2	+1.17	55 37.5	+1.22	23 49.3	1.79	28.5
2	15 15.3	15 19.4	55 52.4	1.25	56 7.6	1.27	6		29.5
3	15 23.6	15 27.7	56 22.9	1.27	56 38.1	1.26	0 38.2	1.85	0.9
4	15 31.8	15 35.8	56 53.1	1.24	57 7.9	1.22	1 18.0	1.94	1.9
5	15 39.8	15 43.6	57 22.4	1.19	57 36.5	1.16	2 5.9	2.07	2.9
6	15 47.3	15 50.9	57 50.2	1.12	58 3.4	1.08	2 57.3	2.23	3.9
7	15 54.4	15 57.7	58 16.0	1.04	58 28.2	0.99	3 52.7	2.38	4.9
8	16 0.8	16 3.8	58 39.8	0.94	58 50.7	0.88	4 51.5	2.50	5.9
9	16 6.6	16 9.1	59 0.9	0.82	59 10.3	0.74	5 52.2	2.54	6.9
10	16 11.4	16 13.4	59 18.6	0.65	59 25.8	0.54	6 52.9	2.49	7.9
11	16 14.9	16 16.1	59 31.6	0.41	59 35.7	+0.27	7 51.7	2.39	8.9
12	16 16.7	16 16.7	59 38.0	+0.11	59 38.2	-0.07	8 47.5	2.26	9.9
13	16 16.2	16 15.0	59 36.2	-0.27	59 31.8	0.47	9 40.2	2.14	10.9
14	16 13.1	16 10.5	59 24.8	0.68	59 15.4	0.89	10 30.3	2.05	11.9
15	16 7.3	16 3.4	59 3.6	1.09	58 49.3	1.28	11 18.9	2.01	12.9
16	15 59.0	15 54.0	58 33.0	1.44	58 14.8	1.58	12 7.0	2.01	13.9
17	15 48.7	15 43.0	57 55.1	1.69	57 34.3	1.77	12 55.4	2.04	14.9
18	15 37.1	15 31.2	57 12.7	1.81	56 50.9	1.82	13 44.8	2.09	15.9
19	15 25.2	15 19.5	56 29.1	1.79	56 7.9	1.73	14 35.5	2.13	16.9
20	15 14.0	15 8.8	55 47.7	1.64	55 28.7	1.51	15 27.1	2.16	17.9
21	15 4.2	14 59.9	55 11.4	1.36	54 56.1	1.19	16 19.1	2.15	18.9
22	14 56.3	14 53.4	54 42.8	1.01	54 31.9	0.81	17 10.4	2.11	19.9
23	14 51.1	14 49.4	54 23.5	0.60	54 17.6	-0.38	18 0.3	2.04	20.9
24	14 48.6	14 48.4	54 14.3	-0.16	54 13.7	+0.06	18 48.2	1.95	21.9
25	14 48.9	14 50.2	54 15.7	+0.27	54 20.2	0.49	19 34.0	1.87	22.9
26	14 52.1	14 54.7	54 27.3	0.69	54 36.7	0.88	20 18.1	1.81	23.9
27	14 57.8	15 1.5	54 48.3	1.05	55 1.8	1.20	21 1.0	1.78	24.9
28	15 5.6	15 10.2	55 17.0	1.34	55 33.8	1.45	21 43.6	1.78	25.9
29	15 15.1	15 20.2	55 51.7	1.53	56 10.4	1.58	22 26.8	1.83	26.9
30	15 25.4	15 30.7	56 29.6	1.61	56 49.0	1.61	23 11.7	1.93	27.9
31	15 35.9	15 41.0	57 8.1	1.58	57 26.7	1.52	23 59.4	2.06	28.9
32	15 45.8	15 50.3	57 44.5	+1.43	58 1.0	+1.33	6		0.3

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
TUESDAY 1.					THURSDAY 3.				
0	11 <sup>h</sup> 50 <sup>m</sup> 11.70	1.8901	N. 6° 15' 11.7"	13.307	0	13 <sup>h</sup> 21 <sup>m</sup> 46.03	1.9491	S. 4° 47' 59.3"	13.958
1	11 52 5.10	1.8899	6 1 52.2	13.343	1	13 23 43.05	1.9517	5 1 56.5	13.948
2	11 53 58.49	1.8897	5 48 30.6	13.376	2	13 25 40.24	1.9547	5 15 53.1	13.937
3	11 55 51.87	1.8896	5 35 7.1	13.409	3	13 27 37.61	1.9570	5 29 49.0	13.925
4	11 57 45.25	1.8896	5 21 41.6	13.442	4	13 29 35.15	1.9605	5 43 44.1	13.910
5	11 59 38.63	1.8897	5 8 14.1	13.474	5	13 31 32.87	1.9634	5 57 38.3	13.895
6	12 1 32.02	1.8899	4 54 44.7	13.505	6	13 33 30.76	1.9664	6 11 31.5	13.878
7	12 3 25.42	1.8901	4 41 13.5	13.534	7	13 35 28.84	1.9697	6 25 23.7	13.861
8	12 5 18.83	1.8902	4 27 40.6	13.563	8	13 37 27.12	1.9729	6 39 14.9	13.842
9	12 7 12.24	1.8904	4 14 6.0	13.591	9	13 39 25.59	1.9762	6 53 4.8	13.822
10	12 9 5.68	1.8908	4 0 29.7	13.619	10	13 41 24.26	1.9795	7 6 53.5	13.801
11	12 10 59.14	1.8912	3 46 51.8	13.645	11	13 43 23.13	1.9829	7 20 40.9	13.778
12	12 12 52.63	1.8918	3 33 12.3	13.671	12	13 45 22.20	1.9862	7 34 26.9	13.755
13	12 14 46.15	1.8923	3 19 31.3	13.696	13	13 47 21.48	1.9898	7 48 11.5	13.731
14	12 16 39.70	1.8928	3 5 48.8	13.720	14	13 49 20.98	1.9935	8 1 54.7	13.706
15	12 18 33.28	1.8934	2 52 4.9	13.742	15	13 51 20.70	1.9972	8 15 36.3	13.680
16	12 20 26.90	1.8941	2 38 19.7	13.764	16	13 53 20.64	2.0008	8 29 16.3	13.651
17	12 22 20.57	1.8950	2 24 33.2	13.786	17	13 55 20.80	2.0045	8 42 54.6	13.622
18	12 24 14.29	1.8958	2 10 45.4	13.807	18	13 57 21.18	2.0083	8 56 31.0	13.592
19	12 26 8.06	1.8966	1 56 56.4	13.826	19	13 59 21.80	2.0123	9 10 5.6	13.561
20	12 28 1.88	1.8975	1 43 6.3	13.844	20	14 1 22.66	2.0162	9 23 38.3	13.528
21	12 29 55.76	1.8986	1 29 15.1	13.862	21	14 3 23.75	2.0203	9 37 9.0	13.494
22	12 31 49.70	1.8990	1 15 22.9	13.878	22	14 5 25.09	2.0245	9 50 37.6	13.458
23	12 33 43.70	1.9007	N. 1° 1' 29.8"	13.893	23	14 7 26.68	2.0288	S. 10° 4' 4.0"	13.421
WEDNESDAY 2.					FRIDAY 4.				
0	12 35 37.78	1.9019	N. 0° 47' 35.8"	13.907	0	14 9 28.52	2.0328	S. 10° 17' 28.2"	13.385
1	12 37 31.93	1.9032	0 33 41.0	13.920	1	14 11 30.61	2.0370	10 30 50.2	13.347
2	12 39 26.16	1.9044	0 19 45.4	13.933	2	14 13 32.96	2.0413	10 44 9.9	13.307
3	12 41 20.46	1.9058	N. 0° 5' 49.1"	13.944	3	14 15 35.57	2.0457	10 57 27.1	13.266
4	12 43 14.85	1.9073	S. 0° 8' 7.9"	13.956	4	14 17 38.44	2.0501	11 10 41.8	13.222
5	12 45 9.33	1.9086	0 22 5.6	13.967	5	14 19 41.58	2.0547	11 23 53.8	13.177
6	12 47 3.89	1.9101	0 36 3.9	13.977	6	14 21 45.00	2.0592	11 37 3.1	13.132
7	12 48 58.55	1.9118	0 50 2.8	13.985	7	14 23 48.69	2.0638	11 50 9.7	13.088
8	12 50 53.31	1.9136	1 4 2.1	13.991	8	14 25 52.66	2.0684	12 3 13.5	13.039
9	12 52 48.18	1.9154	1 18 1.7	13.996	9	14 27 56.90	2.0731	12 16 14.4	12.990
10	12 54 43.15	1.9171	1 32 1.6	14.000	10	14 30 1.43	2.0779	12 29 12.3	12.939
11	12 56 38.23	1.9189	1 46 1.7	14.004	11	14 32 6.25	2.0829	12 42 7.1	12.887
12	12 58 33.42	1.9209	2 0 2.0	14.007	12	14 34 11.37	2.0877	12 54 58.8	12.835
13	13 0 28.73	1.9229	2 14 2.5	14.009	13	14 36 16.78	2.0927	13 7 47.3	12.781
14	13 2 24.17	1.9250	2 28 3.1	14.010	14	14 38 22.49	2.0977	13 20 32.6	12.726
15	13 4 19.73	1.9271	2 42 3.7	14.010	15	14 40 28.50	2.1027	13 33 14.5	12.669
16	13 6 15.42	1.9292	2 56 4.3	14.009	16	14 42 34.81	2.1078	13 45 52.9	12.611
17	13 8 11.24	1.9314	3 10 4.8	14.006	17	14 44 41.43	2.1128	13 58 27.8	12.552
18	13 10 7.19	1.9337	3 24 5.1	14.003	18	14 46 48.35	2.1180	14 10 59.1	12.491
19	13 12 3.29	1.9362	3 38 5.2	13.998	19	14 48 55.59	2.1234	14 23 26.7	12.428
20	13 13 59.54	1.9387	3 52 4.9	13.991	20	14 51 3.15	2.1287	14 35 50.5	12.364
21	13 15 55.93	1.9411	4 6 4.2	13.985	21	14 53 11.03	2.1340	14 48 10.4	12.298
22	13 17 52.47	1.9437	4 20 3.1	13.977	22	14 55 19.23	2.1393	15 0 26.3	12.231
23	13 19 49.17	1.9464	4 34 1.5	13.968	23	14 57 27.75	2.1447	15 12 38.2	12.164
24	13 21 46.03	1.9491	S. 4° 47' 59.3"	13.958	24	14 59 36.59	2.1501	S. 15° 24' 46.0"	12.096

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SATURDAY 5.					MONDAY 7.				
0	14 59 36.59	2.1501	S. 15° 24' 46.0"	12.086	0	16 49 36.38	2.4346	S. 23° 18' 54.9"	7.115
1	15 1 45.76	2.1557	15 36 49.7	12.027	1	16 52 2.63	2.4403	23 25 57.7	6.977
2	15 3 55.27	2.1619	15 48 49.2	11.965	2	16 54 29.21	2.4457	23 32 52.2	6.839
3	15 6 5.11	2.1689	16 0 44.3	11.880	3	16 56 56.11	2.4511	23 39 38.4	6.700
4	15 8 15.29	2.1735	16 12 34.9	11.805	4	16 59 23.34	2.4566	23 46 16.2	6.559
5	15 10 25.81	2.1781	16 24 20.9	11.738	5	17 1 50.90	2.4620	23 52 45.5	6.416
6	15 12 36.66	2.1837	16 36 2.3	11.651	6	17 4 18.79	2.4675	23 59 6.2	6.271
7	15 14 47.86	2.1885	16 47 39.0	11.572	7	17 6 47.00	2.4737	24 5 18.1	6.125
8	15 16 59.41	2.1954	16 59 11.0	11.493	8	17 9 15.51	2.4777	24 11 21.3	5.980
9	15 19 11.30	2.2013	17 10 38.2	11.412	9	17 11 44.32	2.4838	24 17 15.7	5.832
10	15 21 23.54	2.2070	17 22 0.5	11.329	10	17 14 13.44	2.4879	24 23 1.2	5.683
11	15 23 36.13	2.2129	17 33 17.7	11.243	11	17 16 42.87	2.4929	24 28 37.7	5.533
12	15 25 49.08	2.2188	17 44 29.7	11.156	12	17 19 12.59	2.4978	24 34 5.2	5.382
13	15 28 2.38	2.2247	17 55 36.5	11.070	13	17 21 42.60	2.5025	24 39 23.6	5.231
14	15 30 16.04	2.2306	18 6 38.1	10.982	14	17 24 12.89	2.5074	24 44 32.9	5.078
15	15 32 30.05	2.2365	18 17 34.3	10.892	15	17 26 43.48	2.5120	24 49 33.0	4.924
16	15 34 44.42	2.2425	18 28 25.1	10.801	16	17 29 14.34	2.5165	24 54 23.8	4.768
17	15 36 59.15	2.2487	18 39 10.4	10.708	17	17 31 45.46	2.5209	24 59 5.2	4.611
18	15 39 14.25	2.2547	18 49 50.1	10.613	18	17 34 16.84	2.5252	25 3 37.2	4.454
19	15 41 29.71	2.2606	19 0 24.0	10.516	19	17 36 48.48	2.5295	25 7 59.7	4.296
20	15 43 45.53	2.2668	19 10 52.0	10.417	20	17 39 20.38	2.5338	25 12 12.7	4.137
21	15 46 1.72	2.2729	19 21 14.1	10.318	21	17 41 52.54	2.5380	25 16 16.1	3.977
22	15 48 18.27	2.2789	19 31 30.2	10.218	22	17 44 24.94	2.5419	25 20 9.9	3.817
23	15 50 35.19	2.2850	S. 19° 41' 40.3"	10.116	23	17 46 57.56	2.5456	S. 25° 23' 54.1"	3.655
SUNDAY 6.					TUESDAY 8.				
0	15 52 52.47	2.2911	S. 19° 51' 44.2"	10.013	0	17 49 30.41	2.5494	S. 25° 27' 28.5"	3.491
1	15 55 10.12	2.2973	20 1 41.9	9.909	1	17 52 3.48	2.5530	25 30 53.1	3.337
2	15 57 28.14	2.3033	20 11 33.3	9.804	2	17 54 36.77	2.5568	25 34 7.8	3.182
3	15 59 46.52	2.3094	20 21 18.4	9.697	3	17 57 10.29	2.5602	25 37 12.6	2.997
4	16 2 5.27	2.3156	20 30 57.0	9.588	4	17 59 44.00	2.5634	25 40 7.5	2.831
5	16 4 24.39	2.3218	20 40 29.0	9.477	5	18 2 17.90	2.5667	25 42 52.4	2.665
6	16 6 43.88	2.3279	20 49 54.3	9.366	6	18 4 52.00	2.5699	25 45 27.3	2.497
7	16 9 3.74	2.3340	20 59 12.9	9.253	7	18 7 26.28	2.5728	25 47 52.1	2.329
8	16 11 23.96	2.3400	21 8 24.7	9.138	8	18 10 0.73	2.5755	25 50 6.8	2.160
9	16 13 44.54	2.3461	21 17 29.5	9.021	9	18 12 35.34	2.5789	25 52 11.3	1.990
10	16 16 5.49	2.3522	21 26 27.3	8.904	10	18 15 10.11	2.5820	25 54 5.6	1.820
11	16 18 26.80	2.3582	21 35 18.0	8.785	11	18 17 45.04	2.5853	25 55 49.7	1.650
12	16 20 48.48	2.3643	21 44 1.5	8.664	12	18 20 20.13	2.5880	25 57 23.6	1.479
13	16 23 10.52	2.3704	21 52 37.7	8.543	13	18 22 55.36	2.5911	25 58 47.2	1.307
14	16 25 32.92	2.3763	22 1 6.7	8.421	14	18 25 30.71	2.5941	26 0 0.5	1.135
15	16 27 55.68	2.3824	22 9 28.3	8.297	15	18 28 6.17	2.5970	26 1 3.4	0.961
16	16 30 18.80	2.3885	22 17 42.4	8.171	16	18 30 41.75	2.5999	26 1 55.9	0.788
17	16 32 42.27	2.3943	22 25 48.9	8.044	17	18 33 17.44	2.5958	26 2 38.0	0.615
18	16 35 6.10	2.4001	22 33 47.7	7.916	18	18 35 53.24	2.5975	26 3 9.7	0.441
19	16 37 30.28	2.4059	22 41 38.8	7.787	19	18 38 29.13	2.5998	26 3 31.0	0.267
20	16 39 54.81	2.4117	22 49 22.1	7.655	20	18 41 5.09	2.6000	26 3 41.8	-0.093
21	16 42 19.69	2.4175	22 56 57.4	7.521	21	18 43 41.13	2.6012	26 3 42.2	+0.081
22	16 44 44.91	2.4232	23 4 24.7	7.387	22	18 46 17.24	2.6023	26 3 32.1	0.256
23	16 47 10.47	2.4289	23 11 43.9	7.251	23	18 48 53.41	2.6033	26 3 11.5	0.431
24	16 49 36.38	2.4346	S. 23° 18' 54.9"	7.115	24	18 51 29.63	2.6040	S. 26° 2' 40.4"	0.606



## GREENWICH MEAN TIME

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
WEDNESDAY 9.					FRIDAY 11.				
0	18 51 29.63	2.6040	S. 26° 2' 40.4"	0.806	0	20 54 59.50	2.4998	S. 22° 16' 19.0"	8.587
1	18 54 5.89	2.6047	26 1 58.7	0.783	1	20 57 29.35	2.4953	22 7 39.4	8.732
2	18 56 42.19	2.6053	26 1 6.4	0.959	2	20 59 58.93	2.4908	21 58 51.2	8.875
3	18 59 18.52	2.6057	26 0 3.7	1.133	3	21 2 28.24	2.4902	21 49 54.4	9.018
4	19 1 54.87	2.6059	25 58 50.5	1.309	4	21 4 57.28	2.4817	21 40 49.1	9.159
5	19 4 31.23	2.6060	25 57 26.7	1.485	5	21 7 26.04	2.4770	21 31 35.3	9.300
6	19 7 7.59	2.6059	25 55 52.4	1.660	6	21 9 54.52	2.4794	21 22 13.1	9.489
7	19 9 43.94	2.6058	25 54 7.6	1.835	7	21 12 22.72	2.4677	21 12 42.6	9.576
8	19 12 20.28	2.6056	25 52 12.2	2.011	8	21 14 50.64	2.4699	21 3 3.9	9.712
9	19 14 56.61	2.6053	25 50 6.3	2.186	9	21 17 18.27	2.4581	20 53 17.2	9.846
10	19 17 32.91	2.6046	25 47 49.9	2.361	10	21 19 45.61	2.4532	20 43 22.4	9.980
11	19 20 9.16	2.6038	25 45 23.0	2.536	11	21 22 12.65	2.4483	20 33 19.6	10.113
12	19 22 45.37	2.6031	25 42 45.6	2.711	12	21 24 39.40	2.4434	20 23 8.9	10.243
13	19 25 21.53	2.6021	25 39 57.7	2.885	13	21 27 5.86	2.4386	20 12 50.4	10.373
14	19 27 57.62	2.6010	25 36 59.4	3.060	14	21 29 32.03	2.4336	20 2 24.2	10.500
15	19 30 33.65	2.5999	25 33 50.6	3.234	15	21 31 57.90	2.4287	19 51 50.4	10.626
16	19 33 9.61	2.5987	25 30 31.4	3.407	16	21 34 23.47	2.4238	19 41 9.1	10.751
17	19 35 45.48	2.5971	25 27 1.8	3.581	17	21 36 48.74	2.4188	19 30 20.3	10.875
18	19 38 21.25	2.5954	25 23 21.8	3.753	18	21 39 13.72	2.4138	19 19 24.1	10.998
19	19 40 56.93	2.5938	25 19 31.5	3.924	19	21 41 38.40	2.4088	19 8 20.6	11.118
20	19 43 32.50	2.5920	25 15 30.9	4.096	20	21 44 2.78	2.4037	18 57 10.0	11.236
21	19 46 7.97	2.5901	25 11 20.0	4.267	21	21 46 26.85	2.3988	18 45 52.3	11.353
22	19 48 43.31	2.5879	25 6 58.9	4.436	22	21 48 50.62	2.3937	18 34 27.7	11.469
23	19 51 18.52	2.5858	S. 25° 2' 27.7"	4.605	23	21 51 14.09	2.3884	S. 18° 22' 56.1"	11.585
THURSDAY 10.					SATURDAY 12.				
0	19 53 53.61	2.5836	S. 24° 57' 46.3"	4.775	0	21 53 37.26	2.3837	S. 18° 11' 17.7"	11.698
1	19 56 28.56	2.5819	24 52 54.7	4.944	1	21 56 0.13	2.3787	17 59 32.6	11.806
2	19 59 3.35	2.5785	24 47 53.0	5.113	2	21 58 22.70	2.3737	17 47 40.9	11.916
3	20 1 37.98	2.5758	24 42 41.2	5.280	3	22 0 44.96	2.3686	17 35 42.7	12.024
4	20 4 12.45	2.5732	24 37 19.4	5.447	4	22 3 6.92	2.3635	17 23 38.1	12.130
5	20 6 46.76	2.5704	24 31 47.6	5.613	5	22 5 28.58	2.3586	17 11 27.1	12.236
6	20 9 20.90	2.5675	24 26 5.9	5.778	6	22 7 49.95	2.3537	16 59 9.8	12.340
7	20 11 54.86	2.5644	24 20 14.3	5.943	7	22 10 11.02	2.3488	16 46 46.3	12.442
8	20 14 28.63	2.5613	24 14 12.8	6.107	8	22 12 31.79	2.3437	16 34 16.8	12.542
9	20 17 2.22	2.5589	24 8 1.5	6.269	9	22 14 52.26	2.3387	16 21 41.3	12.641
10	20 19 35.61	2.5548	24 1 40.5	6.431	10	22 17 12.43	2.3337	16 8 59.9	12.739
11	20 22 8.79	2.5519	23 55 9.8	6.591	11	22 19 32.31	2.3289	15 56 12.7	12.835
12	20 24 41.76	2.5478	23 48 29.6	6.750	12	22 21 51.91	2.3243	15 43 19.8	12.929
13	20 27 14.52	2.5441	23 41 39.8	6.910	13	22 24 11.22	2.3194	15 30 21.3	13.020
14	20 29 47.06	2.5406	23 34 40.4	7.069	14	22 26 30.23	2.3144	15 17 17.4	13.109
15	20 32 19.39	2.5369	23 27 31.6	7.225	15	22 28 48.95	2.3096	15 4 8.2	13.197
16	20 34 51.49	2.5330	23 20 13.4	7.381	16	22 31 7.39	2.3050	14 50 53.8	13.284
17	20 37 23.35	2.5290	23 12 45.9	7.535	17	22 33 25.55	2.3003	14 37 34.2	13.370
18	20 39 54.97	2.5250	23 5 9.2	7.688	18	22 35 43.42	2.2955	14 24 9.5	13.454
19	20 42 26.35	2.5210	22 57 23.4	7.839	19	22 38 1.01	2.2909	14 10 39.8	13.536
20	20 44 57.49	2.5170	22 49 28.5	7.990	20	22 40 18.33	2.2863	13 57 5.2	13.617
21	20 47 28.38	2.5126	22 41 24.6	8.140	21	22 42 35.37	2.2818	13 43 25.8	13.696
22	20 49 59.01	2.5083	22 33 11.7	8.290	22	22 44 52.14	2.2772	13 29 41.7	13.773
23	20 52 29.38	2.5041	22 24 49.8	8.439	23	22 47 8.64	2.2727	13 15 53.1	13.848
24	20 56 59.50	2.4998	S. 22° 16' 19.0"	8.587	24	22 49 24.86	2.2681	S. 13° 2' 0.0"	13.922

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SUNDAY 13.					TUESDAY 15.				
0	<sup>h</sup> 22 <sup>m</sup> 49 <sup>s</sup> 24.86	2.9681	S. 13° 2' 0.0"	13.9922	0	<sup>h</sup> 0 34 <sup>m</sup> 10.67	2.1903	S. 0° 59' 35.2"	15.561
1	22 51 40.81	2.9637	12 48 2.5	13.994	1	0 36 17.84	2.1188	0 44 1.6	15.557
2	22 53 56.50	2.9595	12 34 0.7	14.065	2	0 38 24.92	2.1173	0 28 28.3	15.551
3	22 56 11.95	2.9554	12 19 54.7	14.134	3	0 40 31.91	2.1158	S. 0 12 55.4	15.544
4	22 58 27.14	2.9510	12 5 44.6	14.203	4	0 42 38.82	2.1145	N. 0 2 37.0	15.535
5	23 0 42.07	2.9466	11 51 30.4	14.270	5	0 44 45.65	2.1132	0 18 8.8	15.525
6	23 2 56.73	2.9424	11 37 12.3	14.333	6	0 46 52.41	2.1120	0 33 40.0	15.513
7	23 5 11.15	2.9383	11 22 50.5	14.394	7	0 48 59.10	2.1109	0 49 10.4	15.500
8	23 7 25.33	2.9343	11 8 25.0	14.455	8	0 51 5.72	2.1098	1 4 40.0	15.485
9	23 9 39.27	2.9304	10 53 55.9	14.514	9	0 53 12.28	2.1088	1 20 8.7	15.470
10	23 11 52.97	2.9263	10 39 23.3	14.569	10	0 55 18.78	2.1079	1 35 36.4	15.452
11	23 14 6.43	2.9225	10 24 47.4	14.626	11	0 57 25.23	2.1071	1 51 2.9	15.439
12	23 16 19.66	2.9184	10 10 8.2	14.680	12	0 59 31.62	2.1061	2 6 28.2	15.411
13	23 18 32.64	2.9145	9 55 25.8	14.734	13	1 1 37.96	2.1054	2 21 52.2	15.389
14	23 20 45.41	2.9110	9 40 40.2	14.786	14	1 3 44.26	2.1047	2 37 14.9	15.366
15	23 22 57.97	2.9075	9 25 51.5	14.836	15	1 5 50.53	2.1042	2 52 36.2	15.342
16	23 25 10.30	2.9037	9 10 59.9	14.884	16	1 7 56.76	2.1035	3 7 56.0	15.316
17	23 27 22.41	2.9000	8 56 5.5	14.929	17	1 10 2.95	2.1030	3 23 14.2	15.288
18	23 29 34.30	2.1964	8 41 8.5	14.972	18	1 12 9.12	2.1026	3 38 30.6	15.258
19	23 31 45.98	2.1930	8 26 8.9	15.014	19	1 14 15.26	2.1022	3 53 45.2	15.228
20	23 33 57.46	2.1897	8 11 6.8	15.055	20	1 16 21.38	2.1018	4 8 58.0	15.197
21	23 36 8.75	2.1865	7 56 2.3	15.094	21	1 18 27.48	2.1016	4 24 8.9	15.165
22	23 38 19.84	2.1832	7 40 55.5	15.133	22	1 20 33.57	2.1014	4 39 17.8	15.130
23	23 40 30.73	2.1798	S. 7° 25' 46.4"	15.170	23	1 22 39.65	2.1012	N. 4 54 24.6	15.094
MONDAY 14.					WEDNESDAY 16.				
0	23 42 41.42	2.1766	S. 7° 10' 35.1"	15.205	0	1 24 45.72	2.1012	N. 5 9 29.1	15.066
1	23 44 51.92	2.1736	6 55 21.8	15.238	1	1 26 51.79	2.1012	5 24 31.3	15.017
2	23 47 2.24	2.1706	6 40 6.6	15.268	2	1 28 57.86	2.1011	5 39 31.2	14.979
3	23 49 12.39	2.1677	6 24 49.6	15.298	3	1 31 3.92	2.1011	5 54 28.8	14.939
4	23 51 22.36	2.1648	6 9 30.8	15.328	4	1 33 9.99	2.1012	6 9 23.9	14.895
5	23 53 32.15	2.1617	5 54 10.3	15.355	5	1 35 16.08	2.1016	6 24 16.3	14.850
6	23 55 41.77	2.1590	5 38 48.3	15.380	6	1 37 22.18	2.1018	6 39 6.0	14.805
7	23 57 51.23	2.1563	5 23 24.8	15.403	7	1 39 28.30	2.1022	6 53 52.9	14.758
8	0 0 0.53	2.1537	5 8 0.0	15.423	8	1 41 34.44	2.1024	7 8 37.0	14.711
9	0 2 9.67	2.1511	4 52 34.0	15.443	9	1 43 40.59	2.1027	7 23 18.2	14.662
10	0 4 18.66	2.1487	4 37 6.8	15.463	10	1 45 46.77	2.1032	7 37 56.4	14.611
11	0 6 27.50	2.1462	4 21 38.5	15.480	11	1 47 52.98	2.1037	7 52 31.5	14.558
12	0 8 36.20	2.1439	4 6 9.2	15.497	12	1 49 59.22	2.1043	8 7 3.4	14.505
13	0 10 44.76	2.1415	3 50 38.9	15.511	13	1 52 5.50	2.1050	8 21 32.1	14.451
14	0 12 53.18	2.1391	3 35 7.9	15.522	14	1 54 11.82	2.1057	8 35 57.6	14.397
15	0 15 1.46	2.1369	3 19 36.3	15.532	15	1 56 18.18	2.1063	8 50 19.8	14.341
16	0 17 9.61	2.1348	3 4 4.1	15.542	16	1 58 24.58	2.1071	9 4 38.6	14.283
17	0 19 17.64	2.1329	2 48 31.3	15.550	17	2 0 31.03	2.1079	9 18 53.8	14.223
18	0 21 25.55	2.1308	2 32 58.1	15.556	18	2 2 37.53	2.1087	9 33 5.4	14.163
19	0 23 33.34	2.1289	2 17 24.6	15.561	19	2 4 44.08	2.1096	9 47 13.4	14.101
20	0 25 41.02	2.1271	2 1 50.8	15.564	20	2 6 50.69	2.1106	10 1 17.6	14.038
21	0 27 48.59	2.1253	1 46 16.9	15.566	21	2 8 57.36	2.1116	10 15 18.0	13.974
22	0 29 56.05	2.1236	1 30 42.9	15.566	22	2 11 4.09	2.1127	10 29 14.5	13.909
23	0 32 3.41	2.1219	1 15 9.0	15.564	23	2 13 10.88	2.1137	10 43 7.1	13.843
24	0 34 10.67	2.1203	S. 0° 59' 35.2"	15.561	24	2 15 17.74	2.1149	N. 10 56 55.7	13.776

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
THURSDAY 17.					SATURDAY 19.				
0	2 15 17.74	2.1149	N.10° 56' 55.7"	13.776	0	3 58 40.59	2.1992	N.20° 20' 5.7"	9.325
1	2 17 24.67	2.1161	11 10 40.3	13.708	1	4 0 52.59	2.2009	20 29 21.8	9.210
2	2 19 31.67	2.1173	11 24 20.7	13.637	2	4 3 4.70	2.2027	20 38 31.0	9.096
3	2 21 38.74	2.1185	11 37 56.8	13.566	3	4 5 16.92	2.2046	20 47 33.4	8.982
4	2 23 45.89	2.1199	11 51 28.6	13.494	4	4 7 29.25	2.2065	20 56 28.9	8.866
5	2 25 53.12	2.1212	12 4 56.1	13.420	5	4 9 41.70	2.2084	21 5 17.4	8.750
6	2 28 0.43	2.1225	12 18 19.1	13.345	6	4 11 54.26	2.2102	21 13 58.9	8.633
7	2 30 7.82	2.1240	12 31 37.6	13.270	7	4 14 6.93	2.2130	21 22 33.4	8.516
8	2 32 15.30	2.1253	12 44 51.5	13.192	8	4 16 19.70	2.2137	21 31 0.8	8.397
9	2 34 22.86	2.1267	12 58 0.7	13.114	9	4 18 32.58	2.2156	21 39 21.1	8.278
10	2 36 30.51	2.1283	13 11 5.2	13.036	10	4 20 45.57	2.2174	21 47 34.2	8.158
11	2 38 38.25	2.1296	13 24 5.0	12.957	11	4 22 58.66	2.2190	21 55 40.1	8.038
12	2 40 46.09	2.1314	13 37 0.0	12.877	12	4 25 11.85	2.2207	22 3 38.8	7.917
13	2 42 54.02	2.1330	13 49 50.2	12.795	13	4 27 25.14	2.2224	22 11 30.2	7.796
14	2 45 2.05	2.1345	14 2 35.4	12.711	14	4 29 38.53	2.2242	22 19 14.3	7.674
15	2 47 10.17	2.1361	14 15 15.6	12.626	15	4 31 52.03	2.2257	22 26 51.1	7.552
16	2 49 18.39	2.1378	14 27 50.6	12.540	16	4 34 5.62	2.2272	22 34 20.6	7.430
17	2 51 26.71	2.1395	14 40 20.5	12.455	17	4 36 19.30	2.2287	22 41 42.7	7.306
18	2 53 35.14	2.1414	14 52 45.2	12.367	18	4 38 33.07	2.2303	22 48 57.4	7.183
19	2 55 43.68	2.1432	15 5 4.6	12.279	19	4 40 46.93	2.2318	22 56 4.7	7.059
20	2 57 52.32	2.1448	15 17 18.7	12.190	20	4 43 0.88	2.2332	23 3 4.5	6.934
21	3 0 1.05	2.1465	15 29 27.4	12.100	21	4 44 14.92	2.2346	23 9 56.8	6.809
22	3 2 9.90	2.1485	15 41 30.7	12.009	22	4 47 29.04	2.2360	23 16 41.6	6.684
23	3 4 18.86	2.1503	N.15° 53' 28.5"	11.916	23	4 49 43.24	2.2373	N.23° 23' 18.9"	6.558
FRIDAY 18.					SUNDAY 20.				
0	3 6 27.94	2.1522	N.16° 5' 20.7"	11.823	0	4 51 57.51	2.2384	N.23° 29' 48.6"	6.432
1	3 8 37.12	2.1539	16 17 7.3	11.729	1	4 54 11.85	2.2397	23 36 10.8	6.306
2	3 10 46.41	2.1559	16 28 48.2	11.634	2	4 56 26.28	2.2411	23 42 25.3	6.178
3	3 12 55.83	2.1579	16 40 23.4	11.539	3	4 58 40.78	2.2423	23 48 32.2	6.051
4	3 15 5.36	2.1597	16 51 52.9	11.442	4	5 0 55.35	2.2434	23 54 31.4	5.922
5	3 17 15.00	2.1616	17 3 16.5	11.344	5	5 3 9.98	2.2443	24 0 22.9	5.794
6	3 19 24.76	2.1637	17 14 34.2	11.245	6	5 5 24.66	2.2453	24 6 6.7	5.666
7	3 21 34.64	2.1656	17 25 45.9	11.145	7	5 7 39.41	2.2464	24 11 42.8	5.537
8	3 23 44.63	2.1674	17 36 51.6	11.044	8	5 9 54.23	2.2475	24 17 11.1	5.407
9	3 25 54.73	2.1694	17 47 51.2	10.942	9	5 12 9.10	2.2483	24 22 31.6	5.277
10	3 28 4.95	2.1714	17 58 44.7	10.841	10	5 14 24.02	2.2492	24 27 44.3	5.147
11	3 30 15.29	2.1735	18 9 32.1	10.738	11	5 16 38.99	2.2498	24 32 49.3	5.018
12	3 32 25.76	2.1755	18 20 13.3	10.634	12	5 18 53.99	2.2504	24 37 46.5	4.888
13	3 34 36.35	2.1774	18 30 48.2	10.529	13	5 21 9.04	2.2512	24 42 35.9	4.758
14	3 36 47.05	2.1792	18 41 16.8	10.423	14	5 23 24.13	2.2518	24 47 17.5	4.628
15	3 38 57.86	2.1812	18 51 39.1	10.317	15	5 25 39.26	2.2524	24 51 51.3	4.497
16	3 41 8.79	2.1832	19 1 55.0	10.211	16	5 27 54.42	2.2529	24 56 17.2	4.366
17	3 43 19.85	2.1854	19 12 4.5	10.103	17	5 30 9.61	2.2533	25 0 35.2	4.235
18	3 45 31.04	2.1875	19 22 7.4	9.994	18	5 32 24.82	2.2537	25 4 45.4	4.104
19	3 47 42.35	2.1894	19 32 3.8	9.885	19	5 34 40.06	2.2543	25 8 47.7	3.973
20	3 49 53.77	2.1912	19 41 53.6	9.774	20	5 36 55.32	2.2544	25 12 42.1	3.841
21	3 52 5.29	2.1930	19 51 36.7	9.662	21	5 39 10.59	2.2546	25 16 28.6	3.709
22	3 54 16.93	2.1951	20 1 13.1	9.551	22	5 41 25.87	2.2547	25 20 7.2	3.576
23	3 56 28.70	2.1972	20 10 42.8	9.438	23	5 43 41.16	2.2550	25 23 37.8	3.445
24	3 58 40.59	2.1992	N.20° 20' 5.7"	9.325	24	5 45 56.47	2.2551	N.25° 27' 0.6"	3.314

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
MONDAY 21.					WEDNESDAY 23.				
0	5 45 56.47	2.9551	N.25° 27' 0.6"	3.314	0	7 33 7.63	2.1895	N.25° 35' 42.0"	2.863
1	5 48 11.77	2.9550	25 30 15.5	3.181	1	7 35 18.92	2.1867	25 32 46.6	2.863
2	5 50 27.07	2.9550	25 33 22.4	3.048	2	7 37 30.04	2.1840	25 29 44.0	3.103
3	5 52 42.37	2.9549	25 36 21.3	2.916	3	7 39 41.00	2.1813	25 26 34.2	3.323
4	5 54 57.66	2.9547	25 39 12.3	2.784	4	7 41 51.80	2.1788	25 23 17.2	3.343
5	5 57 12.94	2.9545	25 41 55.4	2.652	5	7 44 2.43	2.1757	25 19 53.1	3.461
6	5 59 28.20	2.9542	25 44 30.6	2.521	6	7 46 12.89	2.1729	25 16 21.9	3.579
7	6 1 43.44	2.9538	25 46 57.9	2.389	7	7 48 23.18	2.1701	25 12 43.6	3.698
8	6 3 58.66	2.9534	25 49 17.3	2.256	8	7 50 33.30	2.1673	25 8 58.2	3.815
9	6 6 13.85	2.9529	25 51 28.7	2.125	9	7 52 43.25	2.1643	25 5 5.8	3.932
10	6 8 29.01	2.9523	25 53 32.3	1.994	10	7 54 53.02	2.1613	25 1 6.4	4.049
11	6 10 44.13	2.9517	25 55 28.0	1.863	11	7 57 2.61	2.1585	24 57 0.0	4.165
12	6 12 59.22	2.9512	25 57 15.8	1.731	12	7 59 12.04	2.1554	24 52 46.7	4.280
13	6 15 14.27	2.9504	25 58 55.7	1.598	13	8 1 21.26	2.1522	24 48 26.5	4.395
14	6 17 29.27	2.9497	26 0 27.6	1.466	14	8 3 30.31	2.1493	24 43 59.4	4.509
15	6 19 44.23	2.9489	26 1 51.6	1.334	15	8 5 39.17	2.1461	24 39 25.5	4.622
16	6 21 59.13	2.9479	26 3 7.7	1.202	16	8 7 47.84	2.1430	24 34 44.8	4.734
17	6 24 13.97	2.9470	26 4 15.9	1.071	17	8 9 56.33	2.1400	24 29 57.4	4.846
18	6 26 28.76	2.9459	26 5 16.2	0.940	18	8 12 4.64	2.1369	24 25 3.3	4.958
19	6 28 43.48	2.9448	26 6 8.7	0.810	19	8 14 12.76	2.1336	24 20 2.5	5.069
20	6 30 58.13	2.9437	26 6 53.4	0.679	20	8 16 20.68	2.1304	24 14 55.0	5.181
21	6 33 12.72	2.9425	26 7 30.2	0.548	21	8 18 28.41	2.1272	24 9 40.8	5.292
22	6 35 27.23	2.9412	26 7 59.2	0.418	22	8 20 35.94	2.1240	24 4 20.0	5.402
23	6 37 41.66	2.9399	N.26° 8' 20.4"	0.288	23	8 22 43.28	2.1208	N.23° 58' 52.6"	5.511
TUESDAY 22.					THURSDAY 24.				
0	6 39 56.02	2.9386	N.26° 8' 33.8"	0.158	0	8 24 50.43	2.1175	N.23° 53' 18.7"	5.619
1	6 42 10.29	2.9370	26 8 39.4	+0.026	1	8 26 57.38	2.1141	23 47 38.4	5.736
2	6 44 24.47	2.9355	26 8 37.2	-0.102	2	8 29 4.13	2.1108	23 41 51.6	5.834
3	6 46 38.56	2.9340	26 8 27.2	0.231	3	8 31 10.68	2.1075	23 35 58.4	5.940
4	6 48 52.55	2.9325	26 8 9.5	0.359	4	8 33 17.03	2.1042	23 29 58.8	6.046
5	6 51 6.45	2.9308	26 7 44.1	0.488	5	8 35 23.19	2.1010	23 23 52.9	6.151
6	6 53 20.25	2.9291	26 7 11.0	0.616	6	8 37 29.15	2.0977	23 17 40.7	6.256
7	6 55 33.94	2.9272	26 6 30.2	0.744	7	8 39 34.91	2.0944	23 11 22.2	6.361
8	6 57 47.52	2.9255	26 5 41.8	0.870	8	8 41 40.47	2.0909	23 4 57.4	6.464
9	7 0 1.00	2.9238	26 4 45.8	0.997	9	8 43 45.82	2.0875	22 58 26.5	6.567
10	7 2 14.36	2.9217	26 3 42.2	1.124	10	8 45 50.97	2.0841	22 51 49.4	6.669
11	7 4 27.60	2.9196	26 2 30.9	1.252	11	8 47 55.92	2.0809	22 45 6.2	6.771
12	7 6 40.71	2.9175	26 1 12.0	1.379	12	8 50 0.68	2.0777	22 38 16.9	6.872
13	7 8 53.70	2.9155	25 59 45.5	1.505	13	8 52 5.24	2.0743	22 31 21.6	6.972
14	7 11 6.57	2.9134	25 58 11.5	1.630	14	8 54 9.59	2.0708	22 24 20.3	7.072
15	7 13 19.31	2.9112	25 56 30.0	1.755	15	8 56 13.73	2.0674	22 17 13.0	7.171
16	7 15 31.92	2.9090	25 54 41.0	1.880	16	8 58 17.67	2.0641	22 9 59.8	7.269
17	7 17 44.39	2.9068	25 52 44.5	2.004	17	9 0 21.42	2.0608	22 2 40.7	7.368
18	7 19 56.71	2.9042	25 50 40.6	2.127	18	9 2 24.07	2.0575	21 55 15.7	7.465
19	7 22 8.90	2.9019	25 48 29.3	2.250	19	9 4 28.32	2.0542	21 47 44.9	7.562
20	7 24 20.94	2.1906	25 46 10.6	2.374	20	9 6 31.47	2.0508	21 40 8.3	7.659
21	7 26 32.84	2.1971	25 43 44.5	2.497	21	9 8 34.42	2.0475	21 32 25.9	7.755
22	7 28 44.59	2.1945	25 41 11.0	2.620	22	9 10 37.17	2.0442	21 24 37.8	7.850
23	7 30 56.18	2.1920	25 38 30.1	2.742	23	9 12 39.72	2.0409	21 16 1.0	7.944
24	7 33 7.63	2.1895	N.25° 35' 42.0"	2.863	24	9 14 42.08	2.0376	N.21° 6' 44.6"	8.036

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
FRIDAY 25.					SUNDAY 27.				
0	<sup>h</sup> 9 <sup>m</sup> 14 <sup>s</sup> 42.08	2.0376	N. 21° 8' 44.6"	8.036	0	<sup>h</sup> 10 <sup>m</sup> 49 <sup>s</sup> 11.20	1.9193	N. 13° 7' 44.3"	11.753
1	9 16 44.24	2.0344	21 0 39.7	8.129	1	10 51 5.89	1.9105	12 55 57.3	11.814
2	9 18 46.21	2.0312	20 52 29.2	8.221	2	10 53 0.47	1.9087	12 44 6.6	11.875
3	9 20 47.98	2.0278	20 44 13.2	8.313	3	10 54 54.94	1.9071	12 32 12.3	11.935
4	9 22 49.55	2.0246	20 35 51.7	8.403	4	10 56 49.32	1.9058	12 20 14.4	11.994
5	9 24 50.93	2.0215	20 27 24.8	8.493	5	10 58 43.63	1.9045	12 8 13.0	12.052
6	9 26 52.13	2.0184	20 18 52.5	8.583	6	11 0 37.86	1.9031	11 56 8.2	12.109
7	9 28 53.14	2.0153	20 10 14.9	8.671	7	11 2 32.00	1.9017	11 44 0.0	12.166
8	9 30 53.96	2.0120	20 1 32.0	8.759	8	11 4 26.06	1.9004	11 31 48.3	12.224
9	9 32 54.58	2.0088	19 52 43.8	8.848	9	11 6 20.04	1.8992	11 19 33.1	12.280
10	9 34 55.02	2.0058	19 43 50.3	8.935	10	11 8 13.95	1.8979	11 7 14.6	12.336
11	9 36 55.27	2.0027	19 34 51.6	9.022	11	11 10 7.79	1.8968	10 54 52.8	12.390
12	9 38 55.34	1.9997	19 25 47.7	9.108	12	11 12 1.56	1.8957	10 42 27.8	12.444
13	9 40 55.23	1.9967	19 16 38.7	9.193	13	11 13 55.27	1.8944	10 29 59.6	12.496
14	9 42 54.94	1.9936	19 7 24.6	9.277	14	11 15 48.92	1.8937	10 17 28.3	12.548
15	9 44 54.46	1.9906	18 58 5.5	9.360	15	11 17 42.51	1.8928	10 4 53.9	12.599
16	9 46 53.81	1.9877	18 48 41.4	9.444	16	11 19 36.05	1.8920	9 52 16.4	12.650
17	9 48 52.99	1.9848	18 39 12.3	9.525	17	11 21 29.54	1.8911	9 39 35.9	12.700
18	9 50 51.99	1.9820	18 29 38.4	9.608	18	11 23 22.98	1.8904	9 26 52.4	12.749
19	9 52 50.82	1.9791	18 19 59.6	9.688	19	11 25 16.38	1.8896	9 14 6.0	12.798
20	9 54 49.48	1.9762	18 10 15.9	9.768	20	11 27 9.74	1.8891	9 1 16.7	12.845
21	9 56 47.97	1.9735	18 0 27.4	9.848	21	11 29 3.07	1.8886	8 48 24.6	12.892
22	9 58 46.29	1.9707	17 50 34.1	9.928	22	11 30 56.37	1.8879	8 35 29.7	12.939
23	10 0 44.45	1.9679	N. 17° 40' 36.1"	10.006	23	11 32 49.63	1.8874	N. 8° 22' 32.0"	12.985
SATURDAY 26.					MONDAY 28.				
0	10 2 42.44	1.9652	N. 17° 30' 33.4"	10.084	0	11 34 42.86	1.8870	N. 8° 9' 31.6"	13.030
1	10 4 40.27	1.9625	17 20 26.0	10.162	1	11 36 36.07	1.8867	7 56 28.4	13.075
2	10 6 37.94	1.9599	17 10 14.0	10.239	2	11 38 29.27	1.8866	7 43 22.6	13.119
3	10 8 35.46	1.9574	16 59 57.4	10.315	3	11 40 22.46	1.8863	7 30 14.2	13.161
4	10 10 32.82	1.9547	16 49 36.3	10.390	4	11 42 15.63	1.8860	7 17 3.3	13.202
5	10 12 30.03	1.9522	16 39 10.7	10.464	5	11 44 8.79	1.8860	7 3 50.0	13.242
6	10 14 27.09	1.9498	16 28 40.7	10.537	6	11 46 1.95	1.8860	6 50 34.3	13.282
7	10 16 24.00	1.9474	16 18 6.3	10.610	7	11 47 55.11	1.8860	6 37 16.2	13.322
8	10 18 20.77	1.9450	16 7 27.5	10.683	8	11 49 48.27	1.8860	6 23 55.7	13.361
9	10 20 17.39	1.9425	15 56 44.4	10.754	9	11 51 41.44	1.8863	6 10 32.8	13.399
10	10 22 13.87	1.9402	15 45 57.0	10.826	10	11 53 34.62	1.8864	5 57 7.7	13.437
11	10 24 10.21	1.9378	15 35 5.3	10.897	11	11 55 27.81	1.8867	5 43 40.4	13.474
12	10 26 6.41	1.9355	15 24 9.4	10.967	12	11 57 21.03	1.8871	5 30 10.9	13.510
13	10 28 2.48	1.9334	15 13 9.3	11.037	13	11 59 14.27	1.8875	5 16 39.3	13.545
14	10 29 58.42	1.9312	15 2 5.1	11.105	14	12 1 7.53	1.8878	5 3 5.6	13.579
15	10 31 54.23	1.9291	14 50 56.8	11.173	15	12 3 0.81	1.8883	4 49 29.9	13.619
16	10 33 49.91	1.9270	14 39 44.4	11.240	16	12 4 54.13	1.8890	4 35 52.2	13.644
17	10 35 45.47	1.9251	14 28 28.0	11.307	17	12 6 47.49	1.8897	4 22 12.6	13.675
18	10 37 40.92	1.9232	14 17 7.6	11.373	18	12 8 40.90	1.8905	4 8 31.2	13.705
19	10 39 36.25	1.9212	14 5 43.3	11.438	19	12 10 34.35	1.8912	3 54 48.0	13.735
20	10 41 31.46	1.9192	13 54 15.1	11.502	20	12 12 27.84	1.8920	3 41 3.0	13.765
21	10 43 26.55	1.9173	13 42 43.1	11.565	21	12 14 21.39	1.8930	3 27 16.2	13.794
22	10 45 21.53	1.9155	13 31 7.3	11.629	22	12 16 15.00	1.8939	3 13 27.7	13.822
23	10 47 16.41	1.9139	13 19 27.7	11.692	23	12 18 8.66	1.8949	2 59 37.6	13.848
24	10 49 11.20	1.9123	N. 13° 7' 44.3"	11.753	24	12 20 2.38	1.8960	N. 2° 45' 46.0"	13.874

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
TUESDAY 29.					THURSDAY 31.				
0	12 20 2.38	1.8980	N. 2 45 46.0	13.874	0	13 53 36.24	2.0986	S. 8 31 28.7	13.935
1	12 21 56.17	1.8972	2 31 52.8	13.899	1	13 55 38.09	2.0331	8 45 24.0	13.908
2	12 23 50.04	1.8986	2 17 58.2	13.922	2	13 57 40.21	2.0375	8 59 17.7	13.881
3	12 25 43.99	1.8999	2 4 2.2	13.945	3	13 59 42.59	2.0420	9 13 9.8	13.852
4	12 27 38.02	1.9012	1 50 4.8	13.968	4	14 1 45.24	2.0465	9 27 0.0	13.820
5	12 29 32.13	1.9026	1 36 6.1	13.988	5	14 3 48.17	2.0512	9 40 48.2	13.786
6	12 31 26.23	1.9042	1 22 6.2	14.008	6	14 5 51.39	2.0561	9 54 34.4	13.753
7	12 33 20.62	1.9057	1 8 5.1	14.029	7	14 7 54.90	2.0608	10 8 18.6	13.719
8	12 35 15.01	1.9073	0 54 2.9	14.046	8	14 9 58.69	2.0656	10 22 0.7	13.683
9	12 37 9.49	1.9089	0 39 59.6	14.064	9	14 12 2.77	2.0705	10 35 40.6	13.646
10	12 39 4.08	1.9107	0 25 55.2	14.082	10	14 14 7.15	2.0755	10 49 18.3	13.608
11	12 40 58.78	1.9125	N. 0 11 49.8	14.097	11	14 16 11.83	2.0806	11 2 53.6	13.567
12	12 42 53.59	1.9145	S. 0 2 16.4	14.111	12	14 18 16.82	2.0857	11 16 26.4	13.526
13	12 44 48.52	1.9165	0 16 23.5	14.125	13	14 20 22.12	2.0909	11 29 56.6	13.483
14	12 46 43.57	1.9185	0 30 31.4	14.138	14	14 22 27.73	2.0960	11 43 24.3	13.439
15	12 48 38.74	1.9206	0 44 40.0	14.149	15	14 24 33.64	2.1012	11 56 49.3	13.393
16	12 50 34.04	1.9229	0 58 49.3	14.160	16	14 26 39.87	2.1066	12 10 11.5	13.346
17	12 52 29.48	1.9251	1 12 59.2	14.170	17	14 28 46.43	2.1120	12 23 30.8	13.297
18	12 54 25.05	1.9273	1 27 9.7	14.179	18	14 30 53.32	2.1178	12 36 47.1	13.246
19	12 56 20.76	1.9297	1 41 20.7	14.188	19	14 33 0.54	2.1230	12 50 0.3	13.193
20	12 58 16.62	1.9322	1 55 32.2	14.195	20	14 35 8.08	2.1283	13 3 10.3	13.140
21	13 0 12.63	1.9347	2 9 44.1	14.202	21	14 37 15.94	2.1338	13 16 17.1	13.085
22	13 2 8.79	1.9373	2 23 56.4	14.207	22	14 39 24.14	2.1395	13 29 20.6	13.029
23	13 4 5.11	1.9399	S. 2 38 8.9	14.210	23	14 41 32.69	2.1454	S. 13 42 20.6	12.970
WEDNESDAY 30.					FRIDAY, NOVEMBER 1.				
0	13 6 1.58	1.9428	S. 2 52 21.6	14.219	0	14 43 41.59	2.1512	S. 13 55 17.0	12.910
1	13 7 58.22	1.9455	3 6 34.3	14.213	PHASES OF THE MOON.				
2	13 9 55.04	1.9485	3 20 47.1	14.213					
3	13 11 52.03	1.9513	3 34 59.9	14.213					
4	13 13 49.20	1.9543	3 49 12.7	14.212					
5	13 15 46.55	1.9574	4 3 25.4	14.210					
6	13 17 44.06	1.9604	4 17 37.9	14.205	☉ New Moon, . . . 2 3 30.7 ☾ First Quarter, . . . 9 9 3.9 ☉ Full Moon, . . . 16 3 34.7 ☾ Last Quarter, . . . 23 20 53.7 ☉ New Moon, . . . 31 17 28.2				
7	13 19 41.80	1.9637	4 31 50.0	14.199					
8	13 21 39.72	1.9671	4 46 1.8	14.193					
9	13 23 37.85	1.9705	5 0 13.2	14.186					
10	13 25 36.18	1.9739	5 14 24.1	14.177					
11	13 27 34.71	1.9772	5 28 34.5	14.168	☾ Perigee, . . . . . 12 7.4 ☾ Apogee, . . . . . 24 8.9				
12	13 29 33.44	1.9807	5 42 44.3	14.157					
13	13 31 32.39	1.9844	5 56 53.4	14.146					
14	13 33 31.57	1.9881	6 11 1.8	14.133					
15	13 35 30.97	1.9920	6 25 9.4	14.119					
16	13 37 30.60	1.9958	6 39 16.1	14.103					
17	13 39 30.46	1.9996	6 53 21.8	14.086					
18	13 41 30.54	2.0033	7 7 26.5	14.069					
19	13 43 30.86	2.0074	7 21 30.1	14.050					
20	13 45 31.43	2.0116	7 35 32.5	14.029					
21	13 47 32.26	2.0158	7 49 33.6	14.007					
22	13 49 33.33	2.0200	8 3 33.4	13.985					
23	13 51 34.66	2.0243	8 17 31.8	13.960					
24	13 53 36.24	2.0286	S. 8 31 28.7	13.935					

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.		Noon.	P. L. of Diff.	III <sup>h</sup> .	P. L. of Diff.	VI <sup>h</sup> .	P. L. of Diff.	IX <sup>h</sup> .	P. L. of Diff.
4	SUN	W.	22° 17' 35"	3027	23° 47' 14"	3009	25° 17' 16"	2998	26° 47' 38"	2977
	Antares	E.	34 59 23	2649	33 21 35	2644	31 43 40	2640	30 5 39	2636
	Saturn	E.	71 10 9	2629	69 31 53	2631	67 53 26	2612	66 14 48	2604
	α Aquilæ	E.	85 27 59	3407	84 5 50	3402	82 43 37	3401	81 21 22	3399
5	SUN	W.	34 23 56	2913	35 55 58	2902	37 28 14	2891	39 0 44	2881
	Saturn	E.	57 58 50	2565	56 19 7	2557	54 39 13	2550	52 59 9	2543
	α Aquilæ	E.	74 30 11	3415	73 8 11	3423	71 46 20	3431	70 24 39	3443
	Fomalhaut	E.	104 41 9	2728	103 5 6	2717	101 28 49	2707	99 52 19	2696
6	SUN	W.	46 46 25	2834	48 20 9	2825	49 54 5	2816	51 28 12	2807
	Venus	W.	24 43 59	2919	26 15 54	2909	27 48 2	2900	29 20 23	2889
	Saturn	E.	44 36 27	2510	42 55 27	2503	41 14 18	2497	39 33 1	2492
	α Aquilæ	E.	63 40 16	3535	62 20 30	3561	61 1 13	3590	59 42 28	3622
	Fomalhaut	E.	91 46 45	2655	90 9 5	2648	88 31 15	2641	86 53 16	2635
	α Pegasi	E.	110 0 11	2942	108 28 45	2925	106 56 58	2910	105 24 52	2895
7	SUN	W.	59 21 33	2766	60 56 45	2759	62 32 7	2750	64 7 40	2744
	Venus	W.	37 4 55	2847	38 38 22	2838	40 12 0	2831	41 45 48	2822
	Saturn	E.	31 4 44	2467	29 22 45	2465	27 40 42	2462	25 58 35	2460
	α Aquilæ	E.	53 18 56	3854	52 4 49	3918	50 51 47	3966	49 39 54	4062
	Fomalhaut	E.	78 41 15	2607	77 2 29	2602	75 23 37	2599	73 44 40	2596
	α Pegasi	E.	97 40 8	2837	96 6 28	2828	94 32 36	2819	92 58 33	2811
8	SUN	W.	72 7 50	2707	73 44 21	2699	75 21 2	2692	76 57 52	2686
	Venus	W.	49 37 21	2785	51 12 9	2778	52 47 6	2770	54 22 13	2763
	Antares	W.	19 46 49	2476	21 28 36	2451	23 10 58	2432	24 53 47	2417
	Fomalhaut	E.	65 28 59	2585	63 49 44	2586	62 10 30	2587	60 31 17	2579
	α Pegasi	E.	85 6 0	2782	82 31 9	2779	81 56 13	2776	80 21 14	2774
9	SUN	W.	85 4 17	2652	86 42 1	2646	88 19 53	2640	89 57 53	2634
	Venus	W.	62 20 3	2729	63 56 4	2723	65 32 13	2716	67 8 31	2710
	Antares	W.	33 32 22	2363	35 16 50	2354	37 1 31	2346	38 46 24	2337
	Fomalhaut	E.	52 16 14	2613	50 37 37	2602	48 59 12	2633	47 21 2	2646
	α Pegasi	E.	72 26 3	2779	70 51 7	2782	69 16 16	2788	67 41 32	2795
10	SUN	W.	98 9 56	2606	99 48 43	2600	101 27 38	2596	103 6 39	2591
	Venus	W.	75 12 2	2681	76 49 7	2675	78 26 20	2670	80 3 40	2665
	Antares	W.	47 33 32	2303	49 19 27	2298	51 5 30	2291	52 51 42	2286
	Fomalhaut	E.	39 15 46	2756	37 40 20	2791	36 5 40	2832	34 31 54	2879
	α Pegasi	E.	59 50 43	2651	58 17 21	2668	56 44 21	2687	55 11 46	26910
	α Arietis	E.	100 44 0	2388	99 0 8	2382	97 16 7	2376	95 31 58	2371
11	SUN	W.	111 23 20	2569	113 2 58	2566	114 42 40	2563	116 22 26	2559
	Venus	W.	88 11 58	2643	89 49 55	2638	91 27 58	2635	93 6 5	2632
	Antares	W.	61 44 35	2262	63 31 30	2259	65 18 30	2255	67 5 36	2252
	Saturn	W.	25 17 12	2999	27 3 13	2991	28 49 25	2984	30 35 48	2978
	α Pegasi	E.	47 37 31	3078	46 8 55	3127	44 41 18	3183	43 14 48	3245
	α Arietis	E.	86 49 31	2350	85 4 45	2348	83 19 55	2345	81 35 1	2343
	Aldebaran	E.	117 19 21	2275	115 32 45	2271	113 46 3	2267	111 59 15	2263
12	SUN	W.	124 42 12	2549	126 22 17	2548	128 2 23	2548	129 42 30	2548
	Venus	W.	101 17 42	2620	102 56 10	2618	104 34 41	2617	106 13 13	2615
	Antares	W.	76 2 11	2239	77 49 40	2237	79 37 12	2237	81 24 45	2235
	Saturn	W.	39 29 38	2257	41 16 41	2255	43 3 47	2252	44 50 57	2251

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
4	Sun W.	28 18 20	2963	29 49 19	2949	31 20 36	2937	32 52 8	2924
	Antares E.	28 27 33	2933	26 49 23	2932	25 11 11	2932	23 32 59	2934
	Saturn E.	64 35 58	2596	62 56 58	2588	61 17 46	2580	59 38 24	2572
	α Aquilæ E.	79 59 4	3399	78 36 46	3400	77 14 30	3404	75 52 18	3408
5	Sun W.	40 33 27	2971	42 6 23	2962	43 39 31	2952	45 12 52	2942
	Saturn E.	51 18 56	2536	49 38 33	2529	47 58 0	2522	46 17 18	2516
	α Aquilæ E.	69 3 11	3456	67 41 58	3472	66 21 3	3490	65 0 28	3511
	Fomalhaut E.	98 15 36	2688	96 38 40	2680	95 1 33	2671	93 24 14	2663
6	Sun W.	53 2 31	2798	54 37 1	2791	56 11 41	2782	57 46 32	2775
	Venus W.	30 52 54	2981	32 25 37	2972	33 58 32	2963	35 31 38	2955
	Saturn E.	37 51 36	2487	36 10 4	2481	34 28 24	2476	32 46 37	2472
	α Aquilæ E.	58 24 17	3680	57 6 47	3700	55 50 0	3746	54 34 1	3797
	Fomalhaut E.	85 15 8	2629	83 36 52	2622	81 58 27	2617	80 19 55	2611
	α Pegasi E.	103 52 27	2983	102 19 46	2969	100 46 48	2958	99 13 35	2947
7	Sun W.	65 43 22	2736	67 19 14	2729	68 55 16	2721	70 31 28	2713
	Venus W.	43 19 47	2915	44 53 56	2908	46 28 14	2799	48 2 43	2792
	Saturn E.	24 16 26	2459	22 34 15	2461	20 52 7	2465	19 10 4	2471
	α Aquilæ E.	48 29 15	4150	47 20 1	4246	46 12 18	4353	45 6 14	4477
	Fomalhaut E.	72 5 39	2592	70 26 33	2590	68 47 24	2588	67 8 12	2587
	α Pegasi E.	91 24 19	2904	89 49 56	2797	88 15 24	2792	86 40 45	2787
8	Sun W.	78 34 51	2679	80 11 59	2672	81 49 16	2666	83 26 42	2659
	Venus W.	55 57 29	2756	57 32 54	2750	59 8 28	2743	60 44 11	2736
	Antares W.	26 36 57	2405	28 20 24	2394	30 4 8	2382	31 48 8	2373
	Fomalhaut E.	58 52 7	2591	57 13 0	2594	55 33 57	2599	53 55 1	2606
	α Pegasi E.	78 46 12	2773	77 11 9	2772	75 36 5	2774	74 1 3	2775
9	Sun W.	91 36 2	2628	93 14 19	2622	94 52 44	2617	96 31 16	2611
	Venus W.	68 44 57	2704	70 21 32	2698	71 58 14	2692	73 35 4	2687
	Antares W.	40 31 29	2330	42 16 45	2323	44 2 11	2316	45 47 47	2310
	Fomalhaut E.	45 43 9	2660	44 5 36	2679	42 28 28	2701	40 51 50	2727
	α Pegasi E.	66 6 57	2903	64 32 33	2912	62 58 21	2924	61 24 24	2936
10	Sun W.	104 45 47	2586	106 25 1	2581	108 4 22	2577	109 43 48	2573
	Venus W.	81 41 7	2660	83 18 40	2655	84 56 20	2651	86 34 6	2646
	Antares W.	54 38 2	2391	56 24 30	2376	58 11 5	2371	59 57 47	2367
	Fomalhaut E.	32 59 8	2938	31 27 37	3005	29 57 30	3087	28 29 4	3188
	α Pegasi E.	53 39 40	2936	52 8 7	2966	50 37 12	2999	49 6 58	3037
	α Arietis E.	93 47 41	2366	92 3 18	2362	90 18 48	2357	88 34 12	2354
11	Sun W.	118 2 17	2557	119 42 11	2554	121 22 9	2553	123 2 9	2551
	Venus W.	94 44 17	2629	96 22 33	2626	98 0 53	2624	99 39 16	2621
	Antares W.	68 52 46	2249	70 40 1	2245	72 27 21	2243	74 14 44	2241
	Saturn W.	32 22 20	2272	34 9 0	2268	35 55 47	2264	37 42 40	2260
	α Pegasi E.	41 49 32	3316	40 25 39	3399	39 3 21	3489	37 42 45	3591
	α Arietis E.	79 51 4	2342	78 5 5	2340	76 20 4	2340	74 35 3	2339
	Aldebaran E.	110 12 21	2260	108 25 23	2257	106 38 20	2254	104 51 13	2252
12	Sun W.	131 22 37	2548	133 2 44	2548	134 42 51	2548	136 22 57	2551
	Venus W.	107 51 47	2615	109 30 21	2615	111 8 55	2615	112 47 29	2616
	Antares W.	83 12 20	2235	84 59 55	2235	86 47 31	2235	88 36 6	2235
	Saturn W.	46 38 8	2249	48 25 22	2249	50 12 37	2248	51 59 53	2248



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.		Noon.	P. L. of Diff.	III <sup>h</sup> .	P. L. of Diff.	VI <sup>h</sup> .	P. L. of Diff.	IX <sup>h</sup> .	P. L. of Diff.
12	$\alpha$ Arietis	E.	72° 50' 1"	2340	71° 5' 0"	2341	69° 20' 0"	2343	67° 35' 3"	2345
	Aldebaran	E.	103 4 3	2350	101 16 50	2348	99° 29' 34"	2347	97 42 16	2346
13	Antares	W.	90 22 41	2337	92 10 14	2338	93 57 45	2339	95 45 14	2349
	Saturn	W.	53 47 9	2249	55 34 24	2249	57 21 38	2251	59 8 49	2253
	$\alpha$ Aquilæ	W.	50 42 45	2799	51 59 1	2658	53 16 33	2593	54 35 15	2534
	$\alpha$ Arietis	E.	58 51 29	2368	57 7 9	2375	55 22 59	2384	53 30 1	2393
	Aldebaran	E.	88 45 38	2247	86 58 20	2249	85 11 5	2250	83 23 52	2253
14	Antares	W.	104 41 33	2259	106 28 33	2264	108 15 26	2269	110 2 11	2274
	Saturn	W.	68 3 53	2268	69 50 39	2273	71 37 18	2278	73 23 50	2283
	$\alpha$ Aquilæ	W.	61 22 56	3392	62 46 42	3293	64 11 2	3266	65 35 53	3243
	$\alpha$ Arietis	E.	45 3 12	2462	43 21 6	2481	41 39 26	2503	39 58 17	2527
	Aldebaran	E.	74 28 53	2271	72 42 11	2276	70 55 36	2281	69 9 9	2287
15	Saturn	W.	82 14 20	2316	83 59 56	2324	85 45 20	2333	87 30 32	2342
	$\alpha$ Aquilæ	W.	72 45 45	3171	74 12 29	3163	75 39 22	3158	77 6 21	3155
	Fomalhaut	W.	38 14 36	2756	39 50 1	2731	41 26 0	2709	43 2 28	2692
	Aldebaran	E.	60 19 22	2325	58 33 59	2335	56 48 50	2344	55 3 55	2354
	Pollux	E.	104 22 46	2301	102 36 48	2309	100 51 1	2317	99 5 26	2326
16	Saturn	W.	96 13 6	2392	97 56 52	2403	99 40 23	2415	101 23 37	2426
	$\alpha$ Aquilæ	W.	84 21 26	3168	85 48 14	3175	87 14 53	3183	88 41 22	3194
	Fomalhaut	W.	51 8 58	2652	52 46 42	2650	54 24 29	2650	56 2 16	2651
	$\alpha$ Pegasi	W.	37 10 55	2674	38 28 10	2586	39 47 0	2509	41 7 14	2446
	Aldebaran	E.	46 23 14	2414	44 39 59	2427	42 57 3	2449	41 14 28	2457
	Pollux	E.	90 20 53	2375	88 36 42	2386	86 52 47	2397	85 9 8	2409
17	$\alpha$ Aquilæ	W.	95 49 59	3270	97 14 45	3289	98 39 9	3311	100 3 8	3332
	Fomalhaut	W.	64 10 11	2676	65 47 23	2684	67 24 24	2692	69 1 15	2701
	$\alpha$ Pegasi	W.	48 3 14	2941	49 28 35	2916	50 54 25	2914	52 20 41	2917
	Pollux	E.	76 35 13	2479	74 53 20	2485	73 11 46	2499	71 30 31	2513
	Jupiter	E.	110 54 50	2531	109 14 20	2545	107 34 9	2559	105 54 17	2571
18	Fomalhaut	W.	77 2 5	2756	78 37 30	2769	80 12 38	2782	81 47 29	2795
	$\alpha$ Pegasi	W.	59 36 5	3131	61 3 37	3129	62 31 12	3126	63 58 48	3126
	Pollux	E.	63 9 13	2585	61 29 57	2600	59 51 2	2615	58 12 27	2629
	Jupiter	E.	97 39 41	2643	96 1 45	2657	94 24 8	2672	92 46 51	2687
	Regulus	E.	99 22 26	2593	97 43 22	2607	96 4 37	2622	94 26 12	2637
	Mars	E.	109 9 54	2792	107 35 15	2807	106 0 56	2821	104 26 56	2837
19	Fomalhaut	W.	89 37 17	2896	91 10 20	2890	92 43 4	2896	94 15 28	2911
	$\alpha$ Pegasi	W.	71 16 12	3148	72 43 23	3155	74 10 26	3163	75 37 20	3171
	Pollux	E.	50 4 39	2705	48 28 6	2721	46 51 54	2736	45 16 2	2751
	Jupiter	E.	84 45 25	2762	83 10 7	2777	81 35 9	2792	80 0 30	2807
	Regulus	E.	86 19 7	2711	84 42 42	2725	83 6 36	2741	81 30 50	2756
	Mars	E.	96 41 55	2914	95 9 54	2930	93 38 13	2945	92 6 51	2960
20	$\alpha$ Pegasi	W.	82 40 6	3221	84 14 50	3233	85 40 20	3244	87 5 37	3257
	$\alpha$ Arietis	W.	39 22 18	3065	40 51 11	3084	42 20 5	3063	43 49 0	3064
	Pollux	E.	37 21 39	2826	35 47 45	2841	34 14 10	2855	32 40 54	2869
	Jupiter	E.	72 12 3	2879	70 39 17	2893	69 6 49	2906	67 34 38	2920
	Regulus	E.	73 36 48	2828	72 2 56	2841	70 29 21	2855	68 56 4	2868
	Mars	E.	84 34 44	3034	83 5 14	3048	81 36 1	3063	80 7 6	3076
	Sun	E.	132 58 18	3182	131 31 47	3196	130 5 33	3209	128 39 35	3224

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.		Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
12	$\alpha$ Arietis	E.	65° 50' 9"	2348	64° 5' 20"	2352	62° 20' 36"	2357	60° 35' 59"	2369
	Aldebaran	E.	95 54 57	2945	94 7 37	2945	92 20 17	2945	90 32 57	2946
13	Antares	W.	97 32 39	2945	99 20 0	2948	101 7 16	2951	102 54 27	2955
	Saturn	W.	60 55 58	2956	62 43 3	2958	64 30 5	2961	66 17 2	2965
	$\alpha$ Aquilæ	W.	55 55 2	3482	57 15 46	3435	58 37 23	3393	59 59 48	3355
	$\alpha$ Arietis	E.	51 55 16	2404	50 11 47	2416	48 28 35	2430	46 45 43	2445
	Aldebaran	E.	81 36 43	2256	79 49 38	2258	78 2 37	2269	76 15 42	2266
14	Antares	W.	111 48 48	2981	113 35 15	2987	115 21 33	2995	117 7 40	2992
	Saturn	W.	75 10 14	2989	76 56 29	2995	78 42 36	2992	80 28 33	2999
	$\alpha$ Aquilæ	W.	67 1 11	3224	68 26 52	3207	69 52 53	3193	71 19 12	3180
	$\alpha$ Arietis	E.	38 17 41	2555	36 37 44	2566	34 58 30	2622	33 20 5	2663
	Aldebaran	E.	67 22 51	2294	65 36 42	2301	63 50 44	2309	62 4 57	2317
15	Saturn	W.	89 15 30	2350	91 0 16	2361	92 44 47	2371	94 29 4	2381
	$\alpha$ Aquilæ	W.	78 33 24	3154	80 0 28	3156	81 27 30	3158	82 54 30	3161
	Fomalhaut	W.	44 39 18	2680	46 16 25	2689	47 53 46	2691	49 31 18	2655
	Aldebaran	E.	53 19 14	2365	51 34 49	2376	49 50 40	2388	48 6 48	2401
	Pollux	E.	97 20 4	2335	95 34 55	2344	93 50 0	2354	92 5 19	2364
16	Saturn	W.	103 6 35	2438	104 49 15	2450	106 31 38	2464	108 13 42	2477
	$\alpha$ Aquilæ	W.	90 7 38	3207	91 33 39	3220	92 59 24	3236	94 24 51	3252
	Fomalhaut	W.	57 40 2	2654	59 17 44	2657	60 55 21	2663	62 32 50	2669
	$\alpha$ Pegasi	W.	42 28 38	3393	43 51 2	3346	45 14 20	3305	46 38 26	3269
	Aldebaran	E.	39 32 14	2473	37 50 23	2490	36 8 56	2508	34 27 54	2527
17	Pollux	E.	83 25 46	2421	81 42 41	2433	79 59 54	2445	78 17 24	2459
	$\alpha$ Aquilæ	W.	101 26 42	3357	102 49 48	3363	104 12 24	3410	105 34 29	3438
	Fomalhaut	W.	70 37 53	2711	72 14 18	2722	73 50 29	2733	75 26 25	2745
	$\alpha$ Pegasi	W.	53 47 18	3163	55 14 11	3151	56 41 19	3149	58 8 38	3135
	Pollux	E.	69 49 36	2527	68 9 1	2541	66 28 45	2556	64 48 49	2570
18	Jupiter	E.	104 14 42	2586	102 35 28	2600	100 56 33	2615	99 17 58	2628
	Fomalhaut	W.	83 22 3	2610	84 56 18	2628	86 30 16	2637	88 3 56	2652
	$\alpha$ Pegasi	W.	65 26 24	3129	66 53 58	3133	68 21 28	3137	69 48 53	3142
	Pollux	E.	56 34 12	2645	54 56 18	2660	53 18 45	2675	51 41 32	2690
	Jupiter	E.	91 9 54	2702	89 33 17	2717	87 57 0	2732	86 21 3	2747
19	Regulus	E.	92 48 7	2652	91 10 22	2666	89 32 57	2681	87 55 52	2696
	Mars	E.	102 53 16	2652	101 19 56	2668	99 46 56	2683	98 14 16	2698
	Fomalhaut	W.	95 47 33	2927	97 19 17	2944	98 50 40	2959	100 21 44	2975
	$\alpha$ Pegasi	W.	77 4 4	3180	78 30 37	3189	79 56 59	3199	81 23 9	3210
	Pollux	E.	43 40 30	2768	42 5 18	2781	40 30 25	2796	38 55 52	2811
20	Jupiter	E.	78 26 11	2921	76 52 11	2936	75 18 30	2951	73 45 8	2964
	Regulus	E.	79 55 24	2769	78 20 16	2785	76 45 28	2799	75 10 59	2813
	Mars	E.	90 35 48	2975	89 5 4	2990	87 34 39	3005	86 4 32	3020
	$\alpha$ Pegasi	W.	88 30 39	3069	89 55 27	3082	91 20 0	3094	92 44 18	3107
	$\alpha$ Arietis	W.	45 17 54	3065	46 46 46	3068	48 15 35	3071	49 44 20	3076
	Pollux	E.	31 7 56	2684	29 35 17	2699	28 2 57	2714	26 30 56	2731
	Jupiter	E.	66 2 45	2934	64 31 9	2946	62 59 49	2966	61 28 46	2971
	Regulus	E.	67 23 4	2682	65 50 22	2694	64 17 56	2706	62 45 47	2720
	Mars	E.	78 38 27	3090	77 10 5	3104	75 42 0	3116	74 14 10	3129
	Sun	E.	127 13 54	3237	125 48 29	3251	124 23 20	3265	122 58 27	3276

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.		Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
21	$\alpha$ Pegasi	W.	94° 8' 21"	3391	95° 32' 8"	3334	96° 55' 40"	3348	98° 18' 56"	3392
	$\alpha$ Arietis	W.	51 12 59	3080	52 41 33	3085	54 10 1	3090	55 38 23	3095
	Jupiter	E.	59 57 57	2985	58 27 25	2996	56 57 7	3008	55 27 4	3030
	Regulus	E.	61 13 53	2939	59 42 15	2944	58 10 52	2956	56 39 44	2968
	Mars	E.	72 46 36	3142	71 19 17	3154	69 52 13	3166	68 25 23	3177
	SUN	E.	121 33 48	3289	120 9 24	3300	118 45 13	3313	117 21 16	3325
22	$\alpha$ Pegasi	W.	105 11 11	3435	106 32 48	3451	107 54 7	3466	109 15 9	3482
	$\alpha$ Arietis	W.	62 58 38	3121	64 26 22	3127	65 53 59	3132	67 21 30	3137
	Aldebaran	W.	32 3 29	3071	33 32 14	3074	35 0 55	3077	36 29 33	3080
	Jupiter	E.	48 0 17	3073	46 31 34	3082	45 3 2	3091	43 34 42	3101
	Regulus	E.	49 7 34	3021	47 37 47	3030	46 8 11	3039	44 38 47	3048
	Mars	E.	61 14 28	3229	59 48 53	3238	58 23 29	3247	56 58 15	3254
23	$\alpha$ Arietis	W.	74 37 40	3158	76 4 40	3161	77 31 36	3163	78 58 29	3167
	Aldebaran	W.	43 51 49	3094	45 20 6	3096	46 48 20	3099	48 16 31	3101
	Jupiter	E.	36 15 38	3141	34 48 18	3148	33 21 7	3156	31 54 5	3163
	Regulus	E.	37 14 29	3091	35 46 8	3098	34 17 56	3106	32 49 54	3114
	Mars	E.	49 54 18	3269	48 29 54	3294	47 5 36	3300	45 41 25	3305
	SUN	E.	99 27 0	3434	98 5 22	3438	96 43 49	3443	95 22 21	3447
24	$\alpha$ Arietis	W.	86 12 11	3175	87 38 50	3175	89 5 29	3176	90 32 7	3175
	Aldebaran	W.	55 37 1	3105	57 5 5	3105	58 33 9	3104	60 1 14	3103
	Regulus	E.	25 32 9	3158	24 5 9	3169	22 38 23	3182	21 11 52	3197
	Mars	E.	38 41 41	3322	37 17 55	3325	35 54 12	3336	34 30 31	3339
	SUN	E.	88 35 59	3459	87 14 49	3460	85 53 40	3461	84 32 32	3460
25	$\alpha$ Arietis	W.	97 45 32	3169	99 12 18	3167	100 39 7	3164	102 5 59	3162
	Aldebaran	W.	67 22 10	3091	68 50 31	3087	70 18 56	3083	71 47 26	3078
	Pollux	W.	23 9 24	3095	24 37 35	3091	26 5 55	3084	27 34 24	3078
	Mars	E.	27 32 33	3334	26 9 1	3336	24 45 31	3338	23 22 3	3329
	SUN	E.	77 46 34	3451	76 25 15	3447	75 3 52	3443	73 42 24	3439
26	Aldebaran	W.	79 11 31	3050	80 40 42	3043	82 10 2	3035	83 39 31	3028
	Pollux	W.	34 58 58	3042	36 28 19	3034	37 57 50	3026	39 27 30	3018
	SUN	E.	66 53 42	3409	65 31 36	3402	64 9 22	3394	62 46 59	3386
27	Aldebaran	W.	91 9 26	2985	92 39 58	2974	94 10 43	2965	95 41 40	2954
	Pollux	W.	46 58 37	2972	48 29 25	2962	50 0 26	2951	51 31 40	2940
	Regulus	W.	11 36 59	3313	13 0 55	3292	14 26 26	3169	15 53 12	3119
	SUN	E.	55 52 39	3340	54 29 14	3329	53 5 36	3317	51 41 44	3306
28	Aldebaran	W.	103 19 44	2900	104 52 3	2888	106 24 37	2877	107 57 25	2865
	Pollux	W.	59 11 22	2983	60 44 3	2870	62 17 0	2859	63 50 12	2846
	Jupiter	W.	23 29 40	3001	24 59 51	2982	26 30 26	2962	28 1 26	2944
	Regulus	W.	23 19 6	2966	24 50 1	2945	26 21 23	2934	27 53 11	2905
	SUN	E.	44 39 13	3347	43 14 0	3326	41 48 33	3223	40 22 51	3209
29	Pollux	W.	71 40 17	2782	73 15 8	2769	74 50 17	2756	76 25 43	2743
	Jupiter	W.	35 42 1	2859	37 15 12	2844	38 48 43	2828	40 22 34	2814
	Regulus	W.	35 38 3	2818	37 12 7	2802	38 46 32	2787	40 21 17	2773
	Mars	W.	19 17 4	3063	20 45 59	3039	22 15 23	3018	23 45 14	2997
	SUN	E.	33 10 26	3143	31 43 9	3131	30 15 37	3118	28 47 49	3105

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.		Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
21	$\alpha$ Pegasi	W.	99 41 56	3376	101 4 40	3391	102 27 7	3406	103 49 17	3420
	$\alpha$ Arietis	W.	57 6 39	3100	58 34 49	3105	60 2 52	3111	61 30 48	3116
	Jupiter	E.	53 57 16	3030	52 27 41	3042	50 58 20	3052	49 29 12	3063
	Regulus	E.	55 8 51	2979	53 38 12	2989	52 7 46	3001	50 37 34	3010
	Mars	E.	66 58 46	3188	65 32 23	3198	64 6 12	3209	62 40 14	3220
	SUN	E.	115 57 33	3335	114 34 2	3346	113 10 44	3356	111 47 37	3366
22	$\alpha$ Pegasi	W.	110 35 53	3498	111 56 19	3515	113 16 26	3532	114 36 15	3550
	$\alpha$ Arietis	W.	68 48 55	3142	70 16 14	3146	71 43 28	3151	73 10 36	3154
	Aldebaran	W.	37 58 7	3082	39 26 38	3086	40 55 5	3088	42 23 29	3091
	Jupiter	E.	42 6 33	3109	40 38 34	3118	39 10 46	3125	37 43 7	3133
	Regulus	E.	43 9 34	3057	41 40 32	3068	40 11 41	3074	38 43 0	3082
	Mars	E.	55 33 10	3263	54 8 15	3270	52 43 28	3276	51 18 49	3283
	SUN	E.	104 54 43	3408	103 32 36	3415	102 10 37	3422	100 48 45	3428
23	$\alpha$ Arietis	W.	80 25 18	3168	81 52 5	3171	83 18 49	3173	84 45 31	3174
	Aldebaran	W.	49 44 39	3102	51 12 46	3103	52 40 52	3104	54 8 57	3105
	Jupiter	E.	30 27 12	3171	29 0 28	3179	27 33 54	3188	26 7 30	3196
	Regulus	E.	31 22 1	3122	29 54 18	3129	28 26 44	3138	26 59 21	3148
	Mars	E.	44 17 19	3309	42 53 18	3313	41 29 22	3317	40 5 30	3319
	SUN	E.	94 0 58	3451	92 39 39	3454	91 18 23	3456	89 57 10	3458
24	$\alpha$ Arietis	W.	91 58 46	3175	93 25 27	3173	94 52 8	3173	96 18 50	3171
	Aldebaran	W.	61 29 20	3101	62 57 28	3099	64 25 39	3096	65 53 53	3094
	Regulus	E.	19 45 39	3215	18 19 48	3239	16 54 25	3268	15 29 36	3306
	Mars	E.	33 6 53	3330	31 43 16	3332	30 19 41	3332	28 56 7	3332
	SUN	E.	83 11 23	3460	81 50 14	3458	80 29 3	3456	79 7 50	3454
25	$\alpha$ Arietis	W.	103 32 54	3158	104 59 53	3154	106 26 57	3151	107 54 5	3147
	Aldebaran	W.	73 16 2	3073	74 44 44	3069	76 13 32	3062	77 42 28	3056
	Pollux	W.	29 3 1	3070	30 31 47	3063	32 0 42	3056	33 29 46	3049
	Mars	E.	21 58 37	3349	20 35 14	3347	19 11 57	3353	17 48 47	3361
	SUN	E.	72 20 52	3434	70 59 14	3429	69 37 30	3423	68 15 40	3416
26	Aldebaran	W.	85 9 9	3020	86 38 57	3011	88 8 56	3003	89 39 5	2993
	Pollux	W.	40 57 21	3009	42 27 23	3000	43 57 36	2990	45 28 1	2981
	SUN	E.	61 24 27	3378	60 1 45	3370	58 38 54	3360	57 15 52	3351
27	Aldebaran	W.	97 12 50	2944	98 44 13	2934	100 15 49	2923	101 47 39	2911
	Pollux	W.	53 3 8	2922	54 34 50	2918	56 6 46	2907	57 38 56	2894
	Regulus	W.	17 20 58	3279	18 49 33	3046	20 18 49	3017	21 48 41	2990
	SUN	E.	50 17 40	3296	48 53 24	3284	47 28 54	3273	46 4 11	3260
28	Aldebaran	W.	109 30 29	2853	111 3 48	2841	112 37 23	2829	114 11 13	2817
	Pollux	W.	65 23 40	2834	66 57 24	2821	68 31 25	2808	70 5 43	2795
	Jupiter	W.	29 32 49	2927	31 4 34	2909	32 36 42	2892	34 9 11	2876
	Regulus	W.	29 25 24	2887	30 58 0	2869	32 30 59	2852	34 4 20	2835
	SUN	E.	38 56 53	3197	37 30 40	3183	36 4 11	3170	34 37 26	3158
29	Pollux	W.	78 1 26	2729	79 37 27	2716	81 13 46	2703	82 50 22	2689
	Jupiter	W.	41 56 44	2798	43 31 15	2783	45 6 5	2768	46 41 15	2753
	Regulus	W.	41 56 22	2756	43 31 48	2741	45 7 33	2726	46 43 38	2712
	Mars	W.	25 15 31	2977	26 46 13	2958	28 17 18	2941	29 48 45	2924
	SUN	E.	27 19 45	3091	25 51 25	3079	24 22 50	3067	22 54 0	3056

## AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S					Sidereal Time of the Semi-diameter passing the Meridian.	Equation of Time, to be subtracted from Apparent Time.	Diff. for 1 hour.		
		Apparent Right Ascension.		Diff. for 1 hour.	Apparent Declination.					Diff. for 1 hour.	Semi-diameter.
		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>				<sup>"</sup>	
Frid.	1	14 27 57.52	9.821	14 37 54.9	47.80	16 9.98	67.02	16 18.87	0.034		
Sat.	2	14 31 53.65	9.856	14 56 55.1	47.20	16 10.23	67.14	16 19.29	0.000		
Sun.	3	14 35 50.59	9.890	15 15 40.7	46.58	16 10.48	67.25	16 19.90	0.034		
Mon.	4	14 39 48.34	9.924	15 34 11.1	45.95	16 10.72	67.37	16 17.71	0.068		
Tues.	5	14 43 46.91	9.958	15 52 26.1	45.30	16 10.96	67.49	16 15.71	0.102		
Wed.	6	14 47 46.29	9.992	16 10 25.1	44.62	16 11.20	67.61	16 12.90	0.136		
Thur.	7	14 51 46.49	10.026	16 28 7.7	43.93	16 11.44	67.73	16 9.26	0.170		
Frid.	8	14 55 47.52	10.061	16 45 33.7	43.22	16 11.68	67.85	16 4.80	0.205		
Sat.	9	14 59 49.39	10.095	17 2 42.6	42.51	16 11.92	67.97	15 59.50	0.239		
Sun.	10	15 3 52.09	10.130	17 19 33.8	41.78	16 12.15	68.09	15 53.37	0.274		
Mon.	11	15 7 55.62	10.164	17 36 7.0	41.02	16 12.38	68.20	15 46.42	0.308		
Tues.	12	15 11 59.98	10.199	17 52 21.9	40.23	16 12.60	68.32	15 38.63	0.343		
Wed.	13	15 16 5.19	10.235	18 8 18.1	39.44	16 12.82	68.44	15 30.00	0.378		
Thur.	14	15 20 11.23	10.270	18 23 55.1	38.64	16 13.04	68.56	15 20.53	0.413		
Frid.	15	15 24 18.12	10.305	18 39 12.7	37.82	16 13.25	68.69	15 10.23	0.448		
Sat.	16	15 28 25.85	10.340	18 54 10.5	36.98	16 13.46	68.80	14 59.09	0.483		
Sun.	17	15 32 34.42	10.375	19 8 48.0	36.14	16 13.66	68.92	14 47.11	0.518		
Mon.	18	15 36 43.83	10.409	19 23 4.9	35.27	16 13.85	69.03	14 34.28	0.552		
Tues.	19	15 40 54.09	10.444	19 37 1.1	34.39	16 14.04	69.14	14 20.63	0.587		
Wed.	20	15 45 5.18	10.478	19 50 35.9	33.49	16 14.23	69.25	14 6.15	0.621		
Thur.	21	15 49 17.08	10.512	20 3 49.2	32.59	16 14.41	69.36	13 50.84	0.655		
Frid.	22	15 53 29.79	10.546	20 16 40.5	31.67	16 14.59	69.47	13 34.72	0.689		
Sat.	23	15 57 43.32	10.579	20 29 9.3	30.74	16 14.77	69.58	13 17.79	0.722		
Sun.	24	16 1 57.65	10.612	20 41 15.4	29.78	16 14.94	69.68	13 0.07	0.755		
Mon.	25	16 6 12.76	10.646	20 52 58.6	28.81	16 15.11	69.78	12 41.58	0.788		
Tues.	26	16 10 28.63	10.678	21 4 18.5	27.82	16 15.28	69.88	12 22.32	0.820		
Wed.	27	16 14 45.25	10.708	21 15 14.6	26.83	16 15.44	69.98	12 2.32	0.850		
Thur.	28	16 19 2.60	10.737	21 25 46.6	25.83	16 15.60	70.08	11 41.59	0.879		
Frid.	29	16 23 20.64	10.765	21 35 54.3	24.80	16 15.86	70.17	11 20.15	0.907		
Sat.	30	16 27 39.36	10.793	21 45 37.3	23.76	16 15.91	70.26	10 58.05	0.935		
Sun.	31	16 31 58.73	10.819	21 54 55.1	22.72	16 16.06	70.35	10 35.29	0.961		

NOTE.—Mean Time of the Semidiameter passing may be found by subtracting 0s.19 from the Sidereal Time.

## AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time, to be added to Mean Time.	Diff. for 1 hour.	Sidereal Time or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.			
Frid.	1	14 28 0.19	9.892	S. 14 38 7.9	47.80	16 18.88	0.034	14 44 19.07
Sat.	2	14 31 56.33	9.856	14 57 7.9	47.19	16 19.30	0.000	14 48 15.63
Sun.	3	14 35 53.28	9.890	15 15 53.3	46.57	16 18.90	0.034	14 52 12.18
Mon.	4	14 39 51.04	9.924	15 34 23.6	45.94	16 17.70	0.068	14 56 8.74
Tues.	5	14 43 49.61	9.958	15 52 38.4	45.29	16 15.68	0.102	15 0 5.29
Wed.	6	14 47 48.99	9.992	16 10 37.2	44.61	16 12.86	0.136	15 4 1.85
Thur.	7	14 51 49.19	10.026	16 28 19.7	43.92	16 9.21	0.170	15 7 58.40
Frid.	8	14 55 50.22	10.061	16 45 45.3	43.21	16 4.74	0.205	15 11 54.96
Sat.	9	14 59 52.08	10.095	17 2 53.9	42.50	15 59.44	0.239	15 15 51.52
Sun.	10	15 3 54.77	10.130	17 19 44.8	41.77	15 53.30	0.274	15 19 48.07
Mon.	11	15 7 58.29	10.164	17 36 17.8	41.01	15 46.34	0.308	15 23 44.63
Tues.	12	15 12 2.64	10.199	17 52 32.4	40.22	15 38.55	0.343	15 27 41.19
Wed.	13	15 16 7.83	10.234	18 8 28.3	39.43	15 29.91	0.378	15 31 37.74
Thur.	14	15 20 13.86	10.269	18 24 5.0	38.63	15 20.44	0.413	15 35 34.30
Frid.	15	15 24 20.73	10.304	18 39 22.2	37.81	15 10.12	0.448	15 39 30.85
Sat.	16	15 28 28.44	10.339	18 54 19.7	36.97	14 58.97	0.483	15 43 27.41
Sun.	17	15 32 36.98	10.374	19 8 56.9	36.13	14 46.99	0.518	15 47 23.97
Mon.	18	15 36 46.36	10.408	19 23 13.5	35.26	14 34.16	0.552	15 51 20.52
Tues.	19	15 40 56.58	10.443	19 37 9.3	34.38	14 20.50	0.587	15 55 17.08
Wed.	20	15 45 7.63	10.477	19 50 43.8	33.48	14 6.01	0.621	15 59 13.64
Thur.	21	15 49 19.50	10.511	20 3 56.7	32.58	13 50.70	0.655	16 3 10.20
Frid.	22	15 53 32.18	10.545	20 16 47.6	31.66	13 34.57	0.689	16 7 6.75
Sat.	23	15 57 45.67	10.578	20 29 16.1	30.73	13 17.64	0.722	16 11 3.31
Sun.	24	16 1 59.95	10.611	20 41 21.9	29.77	12 59.92	0.755	16 14 59.87
Mon.	25	16 6 15.01	10.644	20 53 4.7	28.80	12 41.41	0.788	16 18 56.42
Tues.	26	16 10 30.83	10.676	21 4 24.2	27.81	12 22.15	0.820	16 22 52.98
Wed.	27	16 14 47.39	10.706	21 15 19.9	26.82	12 2.15	0.850	16 26 49.54
Thur.	28	16 19 4.68	10.735	21 25 51.6	25.82	11 41.42	0.879	16 30 46.10
Frid.	29	16 23 22.67	10.763	21 35 59.0	24.79	11 19.98	0.907	16 34 42.65
Sat.	30	16 27 41.33	10.791	21 45 41.6	23.75	10 57.88	0.935	16 38 39.21
Sun.	31	16 32 0.64	10.817	S. 21 54 59.1	22.71	10 35.13	0.961	16 42 35.77

NOTE.—The Semidiameter for Mean Noon may be assumed the same as that for Apparent Noon.

Diff. for 1 hour  
+9°.8565

AT GREENWICH MEAN NOON.										
Day of the Month.	Day of the Year.	THE SUN'S				Logarithm of the Radius Vector of the Earth.	Diff. for 1 hour.	Mean Time of Sidereal Oh.		
		True LONGITUDE.		Diff. for 1 hour.	LATITUDE.					
		$\lambda$	$\lambda'$							
1	306	219° 24' 26.8	24' 1.6	150.36	+0.19	9.9964128	-46.3	<sup>h</sup> 9 <sup>m</sup> 14 <sup>s</sup> 9.89		
2	307	220 24 36.3	24 10.8	150.43	+0.06	.9963018	46.1	9 10 13.98		
3	308	221 24 47.4	24 21.9	150.50	-0.07	.9961914	45.9	9 6 18.07		
4	309	222 25 0.1	24 34.4	150.56	0.21	.9960816	45.6	9 2 22.16		
5	310	223 25 14.5	24 48.7	150.63	0.32	.9959724	45.3	8 58 26.25		
6	311	224 25 30.4	25 4.4	150.69	0.41	.9958641	44.9	8 54 30.34		
7	312	225 25 47.8	25 21.7	150.75	0.48	.9957567	44.4	8 50 34.43		
8	313	226 26 6.7	25 40.4	150.81	0.52	.9956505	43.9	8 46 38.52		
9	314	227 26 27.0	26 0.6	150.87	0.53	.9955456	43.3	8 42 42.61		
10	315	228 26 48.6	26 22.0	150.93	0.52	.9954421	42.7	8 38 46.70		
11	316	229 27 11.6	26 44.9	150.99	0.48	.9953403	42.0	8 34 50.78		
12	317	230 27 36.1	27 9.2	151.05	0.40	.9952402	41.3	8 30 54.87		
13	318	231 28 2.1	27 35.1	151.11	0.30	.9951419	40.4	8 26 58.96		
14	319	232 28 29.5	28 2.3	151.17	0.20	.9950456	39.6	8 23 3.05		
15	320	233 28 58.4	28 31.1	151.23	-0.07	.9949513	38.8	8 19 7.15		
16	321	234 29 28.8	29 1.3	151.30	+0.06	.9948591	38.0	8 15 11.24		
17	322	235 30 0.8	29 33.2	151.37	0.20	.9947690	37.1	8 11 15.33		
18	323	236 30 34.4	30 6.6	151.44	0.31	.9946811	36.2	8 7 19.42		
19	324	237 31 9.7	30 41.7	151.51	0.42	.9945953	35.3	8 3 23.50		
20	325	238 31 46.7	31 18.6	151.58	0.51	.9945115	34.5	7 59 27.59		
21	326	239 32 25.3	31 57.1	151.65	0.58	.9944296	33.7	7 55 31.68		
22	327	240 33 5.6	32 37.2	151.71	0.60	.9943496	32.9	7 51 35.77		
23	328	241 33 47.6	33 19.0	151.78	0.59	.9942714	32.2	7 47 39.86		
24	329	242 34 31.2	34 2.4	151.85	0.56	.9941949	31.5	7 43 43.95		
25	330	243 35 16.4	34 47.4	151.92	0.49	.9941200	30.9	7 39 48.04		
26	331	244 36 3.2	35 34.0	151.98	0.41	.9940465	30.3	7 35 52.13		
27	332	245 36 51.5	36 32.2	152.04	0.31	.9939743	29.7	7 31 56.21		
28	333	246 37 41.2	37 11.7	152.10	0.19	.9939035	29.2	7 28 0.30		
29	334	247 38 32.2	38 2.6	152.15	+0.05	.9938340	28.6	7 24 4.39		
30	335	248 39 24.4	38 54.6	152.20	-0.09	.9937659	28.1	7 20 8.48		
31	336	249 40 17.7	39 47.7	152.25	-0.22	9.9936990	-27.5	7 16 12.56		
NOTE: $\lambda$ corresponds to the true equinox of the date, $\lambda'$ to the mean equinox of January 0d.								Diff. for 1 hour —9 <sup>s</sup> .8296		

GREENWICH MEAN TIME.

THE MOON'S

Day of the Month.

SEMI-  
DIAMETER.

HORIZONTAL PARALLAX.

MERIDIAN PASSAGE.

AGE.

Noon.	Midnight.	Noon.	Diff. for 1 hour.	Midnight.	Diff. for 1 hour.		Diff. for 1 hour.	Noon.
1	15 45.8	15 50.3	57 44.5	+1.43	58 1.0	+1.33	<sup>h</sup> <sup>m</sup> 0 50.6	d 0.3
2	15 54.4	15 58.2	58 16.3	1.21	58 29.9	1.07	0 50.6	2.22
3	16 1.4	16 4.2	58 41.9	0.92	58 52.1	0.77	1 46.0	2.39
4	16 6.5	16 8.2	59 0.4	0.62	59 6.9	0.47	2 45.1	2.52
5	16 9.6	16 10.4	59 11.8	0.34	59 15.0	+0.21	3 46.4	2.56
6	16 10.9	16 11.0	59 16.8	+0.09	59 17.2	-0.03	4 47.8	2.52
7	16 10.8	16 10.2	59 16.2	-0.13	59 14.1	0.22	5 47.1	2.40
8	16 9.3	16 8.1	59 10.9	0.31	59 6.6	0.40	6 42.9	2.25
9	16 6.7	16 5.0	59 1.3	0.49	58 54.9	0.57	7 35.1	2.12
10	16 2.9	16 0.6	58 47.5	0.66	58 39.1	0.75	8 24.7	2.02
11	15 58.0	15 55.1	58 29.5	0.84	58 18.8	0.94	9 12.3	1.96
12	15 51.9	15 48.4	58 6.9	1.03	57 54.0	1.12	9 59.2	1.96
13	15 44.6	15 40.5	57 40.0	1.21	57 25.0	1.28	10 46.4	1.99
14	15 36.2	15 31.7	57 9.2	1.34	56 52.8	1.39	11 34.7	2.05
15	15 27.1	15 22.5	56 35.9	1.42	56 18.8	1.43	12 24.7	2.11
16	15 17.8	15 13.2	56 1.7	1.42	55 44.9	1.38	13 16.2	2.17
17	15 8.8	15 4.6	55 28.7	1.32	55 13.4	1.23	14 8.6	2.18
18	15 0.8	14 57.3	54 59.2	1.13	54 46.4	1.00	15 0.8	2.15
19	14 54.3	14 51.7	54 35.2	0.85	54 26.0	0.68	15 51.9	2.08
20	14 49.8	14 48.5	54 18.8	0.50	54 14.0	-0.30	16 40.9	1.99
21	14 47.8	14 47.8	54 11.6	-0.10	54 11.6	+0.11	17 27.5	1.89
22	14 48.6	14 50.0	54 14.3	+0.33	54 19.6	0.56	18 11.9	1.81
23	14 52.2	14 55.0	54 27.6	0.77	54 38.1	0.98	18 54.6	1.76
24	14 58.6	15 2.8	54 51.2	1.19	55 6.7	1.39	19 36.6	1.75
25	15 7.6	15 13.0	55 24.4	1.56	55 44.1	1.72	20 18.8	1.78
26	15 18.8	15 25.0	56 5.5	1.85	56 28.3	1.94	21 2.3	1.86
27	15 31.5	15 38.1	56 52.0	2.00	57 16.3	2.03	21 48.4	2.00
28	15 44.7	15 51.2	57 40.5	2.01	58 4.4	1.96	22 38.2	2.17
29	15 57.4	16 3.2	58 27.2	1.85	58 48.6	1.70	23 32.6	2.37
30	16 8.2	16 13.1	59 7.9	1.52	59 24.9	1.30	0	29.3
31	16 17.0	16 20.0	59 39.1	+1.06	59 50.2	+0.80	0 31.7	2.55



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
FRIDAY 1.					SUNDAY 3.				
0	14 43 41.59	2.1512	S. 13° 55' 17.0	12.910	0	16 34 7.32	2.4527	S. 22° 36' 55.9	8.907
1	14 45 50.83	2.1570	14 8 9.8	12.850	1	16 36 34.66	2.4586	22 45 4.3	8.071
2	14 48 0.42	2.1626	14 20 59.0	12.788	2	16 39 2.36	2.4645	22 53 4.5	7.934
3	14 50 10.35	2.1685	14 33 44.4	12.725	3	16 41 30.41	2.4704	23 0 56.4	7.795
4	14 52 20.64	2.1746	14 46 26.0	12.660	4	16 43 58.81	2.4762	23 8 39.9	7.654
5	14 54 31.29	2.1805	14 59 3.7	12.595	5	16 46 27.55	2.4820	23 16 14.9	7.511
6	14 56 42.30	2.1865	15 11 37.4	12.527	6	16 48 56.64	2.4876	23 23 41.3	7.368
7	14 58 53.67	2.1926	15 24 7.0	12.457	7	16 51 26.07	2.4933	23 30 59.1	7.224
8	15 1 5.41	2.1988	15 36 32.3	12.384	8	16 53 55.83	2.4989	23 38 8.2	7.078
9	15 3 17.51	2.2047	15 48 53.1	12.310	9	16 56 25.91	2.5041	23 45 8.5	6.930
10	15 5 29.98	2.2109	16 1 9.5	12.235	10	16 58 56.32	2.5094	23 51 59.8	6.779
11	15 7 42.82	2.2170	16 13 21.4	12.160	11	17 1 27.04	2.5146	23 58 42.0	6.628
12	15 9 56.02	2.2232	16 25 28.7	12.082	12	17 3 58.08	2.5199	24 5 15.1	6.476
13	15 12 9.60	2.2295	16 37 31.3	12.003	13	17 6 29.42	2.5249	24 11 39.1	6.324
14	15 14 23.56	2.2359	16 49 29.1	11.921	14	17 9 1.07	2.5301	24 17 54.0	6.170
15	15 16 37.91	2.2423	17 1 21.9	11.837	15	17 11 33.03	2.5350	24 23 59.6	6.015
16	15 18 52.63	2.2486	17 13 9.6	11.753	16	17 14 5.27	2.5396	24 29 55.8	5.858
17	15 21 7.73	2.2547	17 24 52.3	11.669	17	17 16 37.79	2.5444	24 35 42.6	5.701
18	15 23 23.20	2.2610	17 36 29.9	11.582	18	17 19 10.60	2.5492	24 41 19.9	5.541
19	15 25 39.06	2.2676	17 48 2.2	11.492	19	17 21 43.69	2.5537	24 46 47.5	5.380
20	15 27 55.31	2.2742	17 59 29.0	11.401	20	17 24 17.04	2.5579	24 52 5.5	5.219
21	15 30 11.95	2.2805	18 10 50.3	11.308	21	17 26 50.64	2.5621	24 57 13.8	5.056
22	15 32 28.97	2.2869	18 22 6.0	11.214	22	17 29 24.50	2.5665	25 2 12.3	4.893
23	15 34 46.38	2.2934	S. 18° 33' 16.0	11.118	23	17 31 58.62	2.5708	S. 25° 7' 1.0	4.729
SATURDAY 2.					MONDAY 4.				
0	15 37 4.17	2.2998	S. 18° 44' 20.2	11.021	0	17 34 32.99	2.5748	S. 25° 11' 39.8	4.564
1	15 39 22.35	2.3063	18 55 18.5	10.922	1	17 37 7.59	2.5785	25 16 8.7	4.396
2	15 41 40.93	2.3129	19 6 10.9	10.823	2	17 39 42.41	2.5823	25 20 27.6	4.231
3	15 43 59.90	2.3194	19 16 57.3	10.721	3	17 42 17.46	2.5859	25 24 36.5	4.064
4	15 46 19.26	2.3259	19 27 37.5	10.617	4	17 44 52.72	2.5894	25 28 35.3	3.896
5	15 48 39.01	2.3324	19 38 11.4	10.511	5	17 47 28.19	2.5931	25 32 24.0	3.726
6	15 50 59.14	2.3387	19 48 38.9	10.404	6	17 50 3.86	2.5961	25 36 2.4	3.554
7	15 53 19.66	2.3454	19 58 59.9	10.296	7	17 52 39.72	2.5999	25 39 30.5	3.382
8	15 55 40.58	2.3519	20 9 14.4	10.187	8	17 55 15.76	2.6031	25 42 48.3	3.211
9	15 58 1.89	2.3583	20 19 22.3	10.075	9	17 57 51.97	2.6049	25 45 55.8	3.038
10	16 0 23.58	2.3647	20 29 23.4	9.960	10	18 0 28.35	2.6077	25 48 52.9	2.865
11	16 2 45.66	2.3712	20 39 17.6	9.845	11	18 3 4.89	2.6102	25 51 39.6	2.690
12	16 5 8.12	2.3776	20 49 4.8	9.728	12	18 5 41.58	2.6126	25 54 15.8	2.515
13	16 7 30.97	2.3840	20 58 45.0	9.611	13	18 8 18.41	2.6149	25 56 41.5	2.340
14	16 9 54.21	2.3905	21 8 18.1	9.492	14	18 10 55.37	2.6173	25 58 56.7	2.165
15	16 12 17.83	2.3969	21 17 44.0	9.371	15	18 13 32.47	2.6193	26 1 1.4	1.989
16	16 14 41.83	2.4032	21 27 2.6	9.248	16	18 16 9.68	2.6210	26 2 55.4	1.811
17	16 17 6.21	2.4095	21 36 13.8	9.123	17	18 18 46.99	2.6227	26 4 38.8	1.635
18	16 19 30.97	2.4158	21 45 17.4	8.996	18	18 21 24.40	2.6243	26 6 11.6	1.457
19	16 21 56.11	2.4221	21 54 13.4	8.869	19	18 24 1.90	2.6257	26 7 33.7	1.279
20	16 24 21.62	2.4282	22 3 1.7	8.740	20	18 26 39.48	2.6270	26 8 45.1	1.101
21	16 26 47.49	2.4344	22 11 42.2	8.609	21	18 29 17.14	2.6282	26 9 45.8	0.922
22	16 29 13.73	2.4404	22 20 14.8	8.476	22	18 31 54.86	2.6291	26 10 35.8	0.744
23	16 31 40.34	2.4466	22 28 39.4	8.342	23	18 34 32.63	2.6297	26 11 15.1	0.566
24	16 34 7.32	2.4527	S. 22° 36' 55.9	8.207	24	18 37 10.43	2.6304	S. 26° 11' 43.7	0.387

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
TUESDAY 5.					THURSDAY 7.				
0	18 37 10.43	2.6304	S. 26° 11' 43.7"	0.387	0	20 41 33.00	2.5054	S. 23° 9' 2.6"	7.738
1	18 39 48.28	2.6310	26 12 1.5	0.307	1	20 44 3.17	2.5003	23 1 13.9	7.885
2	18 42 26.15	2.6314	26 12 8.5	-0.086	2	20 46 33.04	2.4954	22 53 16.4	8.031
3	18 45 4.05	2.6318	26 12 4.8	+0.159	3	20 49 2.61	2.4902	22 45 10.2	8.176
4	18 47 41.96	2.6318	26 11 50.3	0.332	4	20 51 31.86	2.4848	22 36 55.3	8.330
5	18 50 19.86	2.6317	26 11 25.0	0.511	5	20 54 0.79	2.4794	22 28 31.8	8.463
6	18 52 57.76	2.6315	26 10 49.0	0.690	6	20 56 29.39	2.4741	22 19 59.8	8.603
7	18 55 35.64	2.6311	26 10 2.2	0.870	7	20 58 57.67	2.4687	22 11 19.4	8.743
8	18 58 13.49	2.6306	26 9 4.6	1.050	8	21 1 25.63	2.4633	22 2 30.7	8.880
9	19 0 51.31	2.6299	26 7 56.2	1.229	9	21 3 53.27	2.4579	21 53 33.8	9.016
10	19 3 29.08	2.6291	26 6 37.1	1.406	10	21 6 20.58	2.4525	21 44 28.8	9.150
11	19 6 6.80	2.6282	26 5 7.3	1.586	11	21 8 47.56	2.4469	21 35 15.7	9.285
12	19 8 44.46	2.6271	26 3 26.8	1.764	12	21 11 14.20	2.4412	21 25 54.6	9.418
13	19 11 22.05	2.6257	26 1 35.6	1.943	13	21 13 40.51	2.4356	21 16 25.6	9.548
14	19 13 59.55	2.6244	25 59 33.7	2.120	14	21 16 6.48	2.4301	21 6 48.8	9.678
15	19 16 36.97	2.6229	25 57 21.2	2.297	15	21 18 32.12	2.4246	20 57 4.3	9.805
16	19 19 14.29	2.6212	25 54 58.1	2.474	16	21 20 57.42	2.4189	20 47 12.2	9.931
17	19 21 51.51	2.6194	25 52 24.4	2.651	17	21 23 22.38	2.4130	20 37 12.6	10.056
18	19 24 28.62	2.6175	25 49 40.0	2.828	18	21 25 46.99	2.4074	20 27 5.5	10.180
19	19 27 5.61	2.6154	25 46 45.1	3.003	19	21 28 11.26	2.4017	20 16 51.0	10.302
20	19 29 42.46	2.6130	25 43 39.7	3.178	20	21 30 35.20	2.3962	20 6 29.3	10.421
21	19 32 19.18	2.6107	25 40 23.8	3.353	21	21 32 58.80	2.3905	19 56 0.5	10.539
22	19 34 55.75	2.6082	25 36 57.4	3.527	22	21 35 22.06	2.3847	19 45 24.6	10.657
23	19 37 32.17	2.6056	S. 25° 33' 20.6"	3.700	23	21 37 44.97	2.3790	S. 19° 34' 41.7"	10.773
WEDNESDAY 6.					FRIDAY 8.				
0	19 40 8.44	2.6031	S. 25° 29' 33.4"	3.873	0	21 40 7.54	2.3734	S. 19° 23' 51.9"	10.887
1	19 42 44.54	2.6001	25 25 35.9	4.044	1	21 42 29.77	2.3677	19 12 55.3	11.000
2	19 45 20.45	2.5971	25 21 28.1	4.215	2	21 44 51.66	2.3620	19 1 51.9	11.113
3	19 47 56.18	2.5939	22 17 10.1	4.385	3	21 47 13.22	2.3565	18 50 41.8	11.223
4	19 50 31.72	2.5907	25 12 41.9	4.554	4	21 49 34.44	2.3508	18 39 25.1	11.339
5	19 53 7.06	2.5874	25 8 3.6	4.723	5	21 51 55.32	2.3451	18 28 2.0	11.438
6	19 55 42.21	2.5840	25 3 15.2	4.891	6	21 54 15.85	2.3394	18 16 32.6	11.543
7	19 58 17.15	2.5804	24 58 16.7	5.059	7	21 56 36.05	2.3339	18 4 56.9	11.648
8	20 0 51.86	2.5766	24 53 8.2	5.225	8	21 58 55.92	2.3283	17 53 14.9	11.751
9	20 3 26.34	2.5728	24 47 49.7	5.391	9	22 1 15.45	2.3228	17 41 26.8	11.852
10	20 6 0.59	2.5689	24 42 21.3	5.555	10	22 3 34.65	2.3173	17 29 32.7	11.951
11	20 8 34.61	2.5652	24 36 43.1	5.717	11	22 5 53.52	2.3116	17 17 32.7	12.049
12	20 11 8.41	2.5611	24 30 55.3	5.879	12	22 8 12.05	2.3061	17 5 26.9	12.145
13	20 13 41.95	2.5569	24 24 57.7	6.041	13	22 10 30.25	2.3007	16 53 15.4	12.240
14	20 16 15.23	2.5524	24 18 50.4	6.202	14	22 12 48.13	2.2954	16 40 58.2	12.333
15	20 18 48.24	2.5480	24 12 33.5	6.361	15	22 15 5.70	2.2901	16 28 35.5	12.424
16	20 21 20.99	2.5437	24 6 7.1	6.519	16	22 17 22.94	2.2846	16 16 7.3	12.514
17	20 23 53.48	2.5392	23 59 31.3	6.675	17	22 19 39.86	2.2792	16 3 33.8	12.602
18	20 26 25.70	2.5346	23 52 46.1	6.830	18	22 21 56.45	2.2740	15 50 55.1	12.688
19	20 28 57.64	2.5299	23 45 51.7	6.985	19	22 24 12.73	2.2688	15 38 11.3	12.773
20	20 31 29.29	2.5252	23 38 48.0	7.138	20	22 26 28.70	2.2636	15 25 22.4	12.857
21	20 34 0.66	2.5204	23 31 35.2	7.289	21	22 28 44.36	2.2584	15 12 28.5	12.939
22	20 36 31.74	2.5155	23 24 13.3	7.440	22	22 30 59.71	2.2533	14 59 29.6	13.022
23	20 39 2.52	2.5105	23 16 42.4	7.589	23	22 33 14.76	2.2483	14 46 25.8	13.103
24	20 41 33.00	2.5054	S. 23° 9' 2.6"	7.738	24	22 35 29.50	2.2433	S. 14° 33' 17.3"	13.180

## GREENWICH MEAN TIME

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SATURDAY 9.					MONDAY 11.				
0	22 <sup>h</sup> 35 <sup>m</sup> 29.50	2.9433	S. 14° 33' 17.3"	13.180	0	0 <sup>h</sup> 18 <sup>m</sup> 31.75	2.0750	S. 2° 59' 1.9"	15.199
1	22 37 43.95	2.9283	14 20 4.2	13.256	1	0 20 36.25	2.0742	2 43 49.7	15.208
2	22 39 58.10	2.9233	14 6 46.6	13.330	2	0 22 40.65	2.0725	2 28 37.0	15.215
3	22 42 11.95	2.9284	13 53 24.6	13.404	3	0 24 44.95	2.0709	2 13 23.9	15.221
4	22 44 25.51	2.9238	13 39 58.2	13.478	4	0 26 49.15	2.0693	1 58 10.5	15.224
5	22 46 38.79	2.9190	13 26 27.5	13.546	5	0 28 53.26	2.0679	1 42 57.0	15.226
6	22 48 51.79	2.9143	13 12 52.7	13.614	6	0 30 57.29	2.0665	1 27 43.4	15.227
7	22 51 4.51	2.9096	12 59 13.8	13.682	7	0 33 1.24	2.0652	1 12 29.8	15.227
8	22 53 16.95	2.9049	12 45 30.9	13.747	8	0 35 5.11	2.0638	0 57 16.2	15.226
9	22 55 29.10	2.9003	12 31 44.2	13.810	9	0 37 8.90	2.0625	0 42 2.7	15.223
10	22 57 40.98	2.1869	12 17 53.7	13.874	10	0 39 12.62	2.0615	0 26 49.4	15.219
11	22 59 52.61	2.1918	12 3 59.4	13.936	11	0 41 16.28	2.0605	S. 0 11 36.4	15.213
12	23 2 3.99	2.1875	11 50 1.4	13.996	12	0 43 19.89	2.0596	N. 0 3 36.2	15.206
13	23 4 15.11	2.1831	11 35 59.9	14.054	13	0 45 23.44	2.0586	0 18 48.4	15.200
14	23 6 25.96	2.1787	11 21 55.0	14.110	14	0 47 26.94	2.0579	0 34 0.2	15.192
15	23 8 36.55	2.1745	11 7 46.7	14.166	15	0 49 30.38	2.0571	0 49 11.4	15.181
16	23 10 46.89	2.1704	10 53 35.1	14.221	16	0 51 33.78	2.0564	1 4 21.9	15.170
17	23 12 57.00	2.1665	10 39 20.3	14.273	17	0 53 37.15	2.0558	1 19 31.7	15.157
18	23 15 6.88	2.1626	10 25 2.4	14.323	18	0 55 40.48	2.0553	1 34 40.7	15.142
19	23 17 16.52	2.1586	10 10 41.5	14.373	19	0 57 43.78	2.0547	1 49 48.8	15.126
20	23 19 25.92	2.1547	9 56 17.6	14.423	20	0 59 47.05	2.0543	2 4 55.9	15.108
21	23 21 35.08	2.1508	9 41 50.8	14.470	21	1 1 50.30	2.0540	2 20 1.8	15.089
22	23 23 44.02	2.1473	9 27 21.2	14.516	22	1 3 53.53	2.0537	2 35 6.6	15.070
23	23 25 52.75	2.1438	S. 9 12 48.9	14.560	23	1 5 56.75	2.0536	N. 2 50 10.2	15.049
SUNDAY 10.					TUESDAY 12.				
0	23 28 1.27	2.1402	S. 8 58 14.0	14.603	0	1 7 59.96	2.0534	N. 3 5 12.5	15.027
1	23 30 9.57	2.1366	8 43 36.6	14.643	1	1 10 3.16	2.0533	3 20 13.5	15.005
2	23 32 17.66	2.1339	8 28 56.8	14.683	2	1 12 6.36	2.0534	3 35 13.1	14.980
3	23 34 25.55	2.1296	8 14 14.7	14.720	3	1 14 9.57	2.0535	3 50 11.2	14.955
4	23 36 33.24	2.1265	7 59 30.4	14.757	4	1 16 12.78	2.0536	4 5 7.7	14.927
5	23 38 40.73	2.1233	7 44 43.9	14.792	5	1 18 16.00	2.0537	4 20 2.5	14.899
6	23 40 48.03	2.1201	7 29 55.4	14.825	6	1 20 19.23	2.0540	4 34 55.6	14.871
7	23 42 55.14	2.1170	7 15 4.9	14.858	7	1 22 22.48	2.0543	4 49 47.0	14.841
8	23 45 2.07	2.1141	7 0 12.5	14.888	8	1 24 25.75	2.0547	5 4 36.5	14.808
9	23 47 8.83	2.1112	6 45 18.3	14.918	9	1 26 29.05	2.0553	5 19 24.0	14.775
10	23 49 15.42	2.1083	6 30 22.4	14.946	10	1 28 32.38	2.0558	5 34 9.5	14.740
11	23 51 21.83	2.1054	6 15 24.8	14.974	11	1 30 35.74	2.0562	5 48 52.9	14.705
12	23 53 28.07	2.1027	6 0 25.6	15.000	12	1 32 39.13	2.0569	6 3 34.1	14.668
13	23 55 34.15	2.1001	5 45 24.8	15.025	13	1 34 42.56	2.0576	6 18 13.1	14.631
14	23 57 40.08	2.0976	5 30 22.6	15.048	14	1 36 46.04	2.0584	6 32 49.8	14.591
15	23 59 45.86	2.0951	5 15 19.1	15.068	15	1 38 49.57	2.0592	6 47 24.0	14.549
16	0 1 51.49	2.0927	5 0 14.4	15.088	16	1 40 53.15	2.0600	7 1 55.7	14.507
17	0 3 56.98	2.0903	4 45 8.5	15.108	17	1 42 56.78	2.0610	7 16 24.9	14.465
18	0 6 2.32	2.0879	4 30 1.5	15.125	18	1 45 0.47	2.0620	7 30 51.5	14.420
19	0 8 7.53	2.0858	4 14 53.5	15.140	19	1 47 4.22	2.0630	7 45 15.4	14.375
20	0 10 12.62	2.0837	3 59 44.7	15.154	20	1 49 8.04	2.0641	7 59 36.5	14.327
21	0 12 17.58	2.0817	3 44 35.1	15.167	21	1 51 11.92	2.0653	8 13 54.7	14.279
22	0 14 22.42	2.0797	3 29 24.7	15.179	22	1 53 15.87	2.0665	8 28 10.0	14.231
23	0 16 27.14	2.0777	3 14 13.6	15.190	23	1 55 19.90	2.0678	8 42 22.4	14.182
24	0 18 31.75	2.0759	S. 2 59 1.9	15.199	24	1 57 24.00	2.0690	N. 8 56 31.8	14.132

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
WEDNESDAY 13.					FRIDAY 15.				
0	1 <sup>h</sup> 57 <sup>m</sup> 24.00 <sup>s</sup>	2.0690	N. 8° 56' 31.8"	14.139	0	3 <sup>h</sup> 39 <sup>m</sup> 0.88 <sup>s</sup>	2.1755	N. 18° 53' 49.2"	10.343
1	1 59 28.18	2.0704	9 10 38.2	14.079	1	3 41 11.49	2.1781	19 4 6.7	10.239
2	2 1 32.45	2.0720	9 24 41.3	14.024	2	3 43 22.25	2.1807	19 14 17.9	10.134
3	2 3 36.81	2.0735	9 38 41.1	13.969	3	3 45 33.17	2.1833	19 24 22.8	10.098
4	2 5 41.26	2.0749	9 52 37.6	13.912	4	3 47 44.25	2.1860	19 34 21.3	9.991
5	2 7 45.80	2.0764	10 6 30.6	13.854	5	3 49 55.49	2.1886	19 44 13.4	9.813
6	2 9 50.43	2.0780	10 20 20.1	13.796	6	3 52 6.88	2.1911	19 53 58.9	9.704
7	2 11 55.16	2.0797	10 34 6.1	13.737	7	3 54 18.42	2.1937	20 3 37.9	9.595
8	2 14 0.00	2.0815	10 47 48.5	13.676	8	3 56 30.12	2.1964	20 13 10.3	9.485
9	2 16 4.94	2.0832	11 1 27.2	13.613	9	3 58 41.99	2.1992	20 22 36.1	9.374
10	2 18 9.98	2.0849	11 15 2.1	13.550	10	4 0 54.01	2.2015	20 31 55.2	9.262
11	2 20 15.13	2.0868	11 28 33.2	13.485	11	4 3 6.17	2.2038	20 41 7.6	9.150
12	2 22 20.40	2.0887	11 42 0.4	13.420	12	4 5 18.47	2.2062	20 50 13.2	9.036
13	2 24 25.78	2.0907	11 55 23.6	13.353	13	4 7 30.92	2.2088	20 59 12.0	8.923
14	2 26 31.28	2.0927	12 8 42.8	13.286	14	4 9 43.53	2.2114	21 8 4.0	8.809
15	2 28 36.90	2.0947	12 21 57.9	13.217	15	4 11 56.29	2.2138	21 16 49.1	8.693
16	2 30 42.64	2.0967	12 35 8.8	13.147	16	4 14 9.19	2.2162	21 25 27.2	8.576
17	2 32 48.50	2.0988	12 48 15.5	13.076	17	4 16 22.23	2.2186	21 33 58.3	8.459
18	2 34 54.48	2.1007	13 1 17.9	13.004	18	4 18 35.42	2.2210	21 42 22.3	8.341
19	2 37 0.59	2.1030	13 14 16.0	12.931	19	4 20 48.75	2.2233	21 50 39.2	8.222
20	2 39 6.84	2.1053	13 27 9.7	12.857	20	4 23 2.21	2.2255	21 58 49.0	8.103
21	2 41 13.22	2.1075	13 39 58.9	12.781	21	4 25 15.81	2.2277	22 6 51.6	7.983
22	2 43 19.73	2.1096	13 52 43.5	12.705	22	4 27 29.54	2.2299	22 14 47.0	7.862
23	2 45 26.38	2.1120	N. 14° 5' 23.5"	12.627	23	4 29 43.40	2.2321	N. 22° 22' 35.1"	7.741
THURSDAY 14.					SATURDAY 16.				
0	2 47 33.17	2.1143	N. 14° 17' 58.7"	12.547	0	4 31 57.39	2.2349	N. 22° 30' 15.9"	7.619
1	2 49 40.10	2.1167	14 30 29.1	12.467	1	4 34 11.51	2.2364	22 37 49.4	7.496
2	2 51 47.17	2.1190	14 42 54.7	12.386	2	4 36 25.76	2.2385	22 45 15.5	7.373
3	2 53 54.38	2.1214	14 55 15.4	12.303	3	4 38 40.13	2.2405	22 52 34.2	7.250
4	2 56 1.73	2.1238	15 7 31.1	12.220	4	4 40 54.62	2.2425	22 59 45.5	7.125
5	2 58 9.23	2.1265	15 19 41.8	12.135	5	4 43 9.23	2.2444	23 6 49.3	7.000
6	3 0 16.89	2.1289	15 31 47.4	12.050	6	4 45 23.95	2.2463	23 13 45.6	6.875
7	3 2 24.70	2.1313	15 43 47.9	11.965	7	4 47 38.78	2.2481	23 20 34.4	6.750
8	3 4 32.65	2.1336	15 55 43.3	11.879	8	4 49 53.72	2.2500	23 27 15.6	6.623
9	3 6 40.74	2.1360	16 7 33.4	11.790	9	4 52 8.78	2.2518	23 33 49.2	6.496
10	3 8 48.98	2.1387	16 19 18.1	11.700	10	4 54 23.94	2.2534	23 40 15.2	6.370
11	3 10 57.39	2.1415	16 30 57.4	11.609	11	4 56 39.19	2.2549	23 46 33.6	6.242
12	3 13 5.96	2.1441	16 42 31.2	11.516	12	4 58 54.53	2.2565	23 52 44.2	6.119
13	3 15 14.68	2.1466	16 53 59.4	11.424	13	5 1 9.97	2.2581	23 58 47.1	5.994
14	3 17 23.55	2.1492	17 5 22.1	11.331	14	5 3 25.50	2.2595	24 4 42.3	5.865
15	3 19 32.57	2.1517	17 16 39.2	11.237	15	5 5 41.12	2.2610	24 10 29.7	5.735
16	3 21 41.75	2.1543	17 27 50.6	11.141	16	5 7 56.82	2.2623	24 16 9.3	5.594
17	3 23 51.09	2.1570	17 38 56.2	11.044	17	5 10 12.60	2.2637	24 21 41.0	5.463
18	3 26 0.58	2.1595	17 49 55.9	10.946	18	5 12 28.47	2.2651	24 27 4.9	5.332
19	3 28 10.23	2.1621	18 0 49.7	10.847	19	5 14 44.41	2.2662	24 32 20.9	5.201
20	3 30 20.04	2.1648	18 11 37.6	10.749	20	5 17 0.41	2.2672	24 37 29.0	5.069
21	3 32 30.01	2.1677	18 22 19.6	10.650	21	5 19 16.47	2.2682	24 42 20.2	4.937
22	3 34 40.14	2.1702	18 32 55.6	10.549	22	5 21 32.59	2.2693	24 47 21.5	4.806
23	3 36 50.43	2.1729	18 43 25.5	10.446	23	5 23 48.78	2.2704	24 52 5.9	4.673
24	3 39 0.88	2.1755	N. 18° 53' 49.2"	10.343	24	5 26 5.03	2.2713	N. 24° 56' 42.3"	4.540

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SUNDAY 17.					TUESDAY 19.				
0	5 26 5.03	2.2713	N.24° 56' 42.3"	4.540	0	7 14 44.52	2.2289	N.26° 0' 23.8"	1.837
1	5 28 21.33	2.2721	25 1 10.7	4.406	1	7 16 58.18	2.2263	25 58 29.8	1.964
2	5 30 37.67	2.2726	25 5 31.1	4.273	2	7 19 11.68	2.2238	25 56 28.2	2.090
3	5 32 54.04	2.2732	25 9 43.5	4.140	3	7 21 25.03	2.2212	25 54 19.0	2.217
4	5 35 10.45	2.2739	25 13 47.9	4.006	4	7 23 38.22	2.2184	25 52 2.2	2.343
5	5 37 26.90	2.2745	25 17 44.3	3.873	5	7 25 51.24	2.2156	25 49 37.9	2.467
6	5 39 43.38	2.2749	25 21 32.7	3.740	6	7 28 4.09	2.2127	25 47 6.2	2.590
7	5 41 59.89	2.2753	25 25 13.1	3.605	7	7 30 16.77	2.2099	25 44 27.1	2.714
8	5 44 16.42	2.2756	25 28 45.4	3.470	8	7 32 29.28	2.2071	25 41 40.6	2.837
9	5 46 32.96	2.2757	25 32 9.6	3.335	9	7 34 41.62	2.2041	25 38 46.7	2.960
10	5 48 49.51	2.2760	25 35 25.7	3.200	10	7 36 53.77	2.2009	25 35 45.4	3.083
11	5 51 6.07	2.2761	25 38 33.7	3.065	11	7 39 5.73	2.1979	25 32 36.8	3.204
12	5 53 22.64	2.2762	25 41 33.6	2.930	12	7 41 17.52	2.1948	25 29 20.9	3.325
13	5 55 39.21	2.2761	25 44 25.4	2.795	13	7 43 29.12	2.1917	25 25 57.8	3.445
14	5 57 55.77	2.2759	25 47 9.1	2.661	14	7 45 40.52	2.1884	25 22 27.5	3.565
15	6 0 12.32	2.2757	25 49 44.8	2.527	15	7 47 51.73	2.1852	25 18 50.0	3.684
16	6 2 28.86	2.2755	25 52 12.4	2.392	16	7 50 2.75	2.1821	25 15 5.4	3.803
17	6 4 45.38	2.2753	25 54 31.9	2.257	17	7 52 13.57	2.1786	25 11 13.7	3.921
18	6 7 1.89	2.2749	25 56 43.3	2.122	18	7 54 24.18	2.1752	25 7 14.9	4.039
19	6 9 18.37	2.2744	25 58 46.6	1.987	19	7 56 34.59	2.1719	25 3 9.0	4.157
20	6 11 34.81	2.2737	26 0 41.8	1.852	20	7 58 44.80	2.1685	24 58 56.1	4.274
21	6 13 51.20	2.2729	26 2 28.9	1.717	21	8 0 54.81	2.1651	24 54 36.2	4.390
22	6 16 7.55	2.2722	26 4 7.9	1.582	22	8 3 4.61	2.1616	24 50 9.4	4.505
23	6 18 23.86	2.2714	N.26 5 38.8	1.447	23	8 5 14.20	2.1580	N.24 45 35.7	4.618
MONDAY 18.					WEDNESDAY 20.				
0	6 20 40.12	2.2708	N.26 7 1.6	1.313	0	8 7 23.57	2.1544	N.24 40 55.3	4.730
1	6 22 56.33	2.2697	26 8 16.4	1.180	1	8 9 32.73	2.1509	24 36 8.1	4.844
2	6 25 12.48	2.2688	26 9 23.2	1.046	2	8 11 41.68	2.1474	24 31 14.1	4.956
3	6 27 28.58	2.2678	26 10 22.0	0.912	3	8 13 50.41	2.1437	24 26 13.4	5.068
4	6 29 44.61	2.2665	26 11 12.7	0.778	4	8 15 58.92	2.1400	24 21 6.0	5.178
5	6 32 0.56	2.2652	26 11 55.4	0.645	5	8 18 7.21	2.1363	24 15 52.0	5.288
6	6 34 16.43	2.2638	26 12 30.1	0.511	6	8 20 15.28	2.1327	24 10 31.4	5.398
7	6 36 32.22	2.2625	26 12 56.8	0.378	7	8 22 23.13	2.1290	24 5 4.2	5.508
8	6 38 47.93	2.2611	26 13 15.5	0.245	8	8 24 30.76	2.1253	23 59 30.4	5.618
9	6 41 3.56	2.2596	26 13 26.2	+0.111	9	8 26 38.16	2.1214	23 53 50.0	5.727
10	6 43 19.09	2.2580	26 13 28.9	-0.021	10	8 28 45.33	2.1177	23 48 3.2	5.834
11	6 45 34.52	2.2564	26 13 23.7	0.152	11	8 30 52.28	2.1140	23 42 10.0	5.940
12	6 47 49.86	2.2547	26 13 10.7	0.283	12	8 32 59.01	2.1102	23 36 10.4	6.045
13	6 50 5.09	2.2529	26 12 49.8	0.414	13	8 35 5.51	2.1064	23 30 4.6	6.150
14	6 52 20.21	2.2510	26 12 21.0	0.546	14	8 37 11.78	2.1026	23 23 52.5	6.254
15	6 54 35.21	2.2491	26 11 44.3	0.678	15	8 39 17.82	2.0988	23 17 34.2	6.357
16	6 56 50.09	2.2471	26 10 59.7	0.808	16	8 41 23.63	2.0950	23 11 9.7	6.460
17	6 59 4.86	2.2452	26 10 7.3	0.938	17	8 43 29.21	2.0912	23 4 39.0	6.563
18	7 1 19.51	2.2431	26 9 7.1	1.068	18	8 45 34.57	2.0874	22 58 2.2	6.664
19	7 3 34.03	2.2408	26 7 59.1	1.198	19	8 47 39.70	2.0835	22 51 19.3	6.765
20	7 5 48.41	2.2385	26 6 43.4	1.326	20	8 49 44.59	2.0797	22 44 30.4	6.865
21	7 8 2.65	2.2361	26 5 20.0	1.454	21	8 51 49.26	2.0759	22 37 35.5	6.964
22	7 10 16.75	2.2338	26 3 48.9	1.582	22	8 53 53.70	2.0721	22 30 34.7	7.063
23	7 12 30.71	2.2314	26 2 10.2	1.709	23	8 55 57.91	2.0682	22 23 28.0	7.160
24	7 14 44.52	2.2289	N.26 0 23.8	1.837	24	8 58 1.88	2.0644	N.22 16 15.5	7.257

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
THURSDAY 21.					SATURDAY 23.				
0	8 58 1.88	2.0644	N.22° 16' 15.5"	7.257	0	10 33 4.82	1.9079	N.14° 49' 1.6"	11.115
1	9 0 5.62	2.0605	22 8 57.2	7.354	1	10 34 50.22	1.9056	14 37 52.8	11.179
2	9 2 9.14	2.0570	22 1 33.1	7.450	2	10 36 53.49	1.9033	14 26 40.2	11.242
3	9 4 12.45	2.0538	21 54 3.3	7.545	3	10 38 47.62	1.9011	14 15 23.8	11.304
4	9 6 15.52	2.0493	21 46 27.8	7.640	4	10 40 41.62	1.8990	14 4 3.7	11.366
5	9 8 18.36	2.0454	21 38 46.6	7.735	5	10 42 35.49	1.8969	13 52 39.9	11.428
6	9 10 20.97	2.0415	21 30 59.7	7.829	6	10 44 29.24	1.8949	13 41 12.4	11.488
7	9 12 23.35	2.0378	21 23 7.2	7.920	7	10 46 22.87	1.8929	13 29 41.3	11.548
8	9 14 25.51	2.0342	21 15 9.3	8.012	8	10 48 16.38	1.8908	13 18 6.6	11.608
9	9 16 27.46	2.0307	21 7 5.8	8.103	9	10 50 9.76	1.8888	13 6 28.4	11.666
10	9 18 29.19	2.0269	20 58 56.9	8.193	10	10 52 3.04	1.8870	12 54 46.7	11.724
11	9 20 30.69	2.0230	20 50 42.6	8.283	11	10 53 56.21	1.8853	12 43 1.6	11.780
12	9 22 31.95	2.0193	20 42 22.9	8.373	12	10 55 49.28	1.8836	12 31 13.1	11.838
13	9 24 33.00	2.0158	20 33 57.9	8.461	13	10 57 42.25	1.8820	12 19 21.1	11.895
14	9 26 33.84	2.0121	20 25 27.6	8.548	14	10 59 35.11	1.8802	12 7 25.7	11.951
15	9 28 34.46	2.0085	20 16 52.2	8.634	15	11 1 27.87	1.8786	11 55 27.0	12.006
16	9 30 34.86	2.0049	20 8 11.6	8.720	16	11 3 20.54	1.8771	11 43 25.0	12.060
17	9 32 35.05	2.0013	19 59 25.9	8.805	17	11 5 13.12	1.8757	11 31 19.8	12.114
18	9 34 35.02	1.9978	19 50 35.1	8.890	18	11 7 5.62	1.8744	11 19 11.4	12.167
19	9 36 34.78	1.9943	19 41 39.2	8.974	19	11 8 58.04	1.8731	11 6 59.8	12.219
20	9 38 34.33	1.9908	19 32 38.3	9.057	20	11 10 50.39	1.8721	10 54 45.1	12.271
21	9 40 33.68	1.9871	19 23 32.4	9.139	21	11 12 42.68	1.8709	10 42 27.3	12.323
22	9 42 32.82	1.9838	19 14 21.6	9.221	22	11 14 34.89	1.8695	10 30 6.4	12.373
23	9 44 31.75	1.9805	N.19 5 5.9	9.302	23	11 16 27.02	1.8683	N.10 17 42.5	12.423
FRIDAY 22.					SUNDAY 24.				
0	9 46 30.48	1.9779	N.18 55 45.4	9.382	0	11 18 19.08	1.8672	N.10 5 15.7	12.471
1	9 48 29.01	1.9739	18 46 20.1	9.462	1	11 20 11.08	1.8663	9 52 46.0	12.519
2	9 50 27.34	1.9705	18 36 50.0	9.541	2	11 22 3.04	1.8656	9 40 13.4	12.568
3	9 52 25.47	1.9673	18 27 15.2	9.619	3	11 23 54.95	1.8647	9 27 37.9	12.616
4	9 54 23.41	1.9641	18 17 35.7	9.698	4	11 25 46.81	1.8640	9 14 59.5	12.664
5	9 56 21.16	1.9609	18 7 51.5	9.775	5	11 27 38.63	1.8632	9 2 18.3	12.710
6	9 58 18.72	1.9578	17 58 2.7	9.852	6	11 29 30.40	1.8625	8 49 34.4	12.755
7	10 0 16.09	1.9546	17 48 9.3	9.929	7	11 31 22.14	1.8620	8 36 47.8	12.800
8	10 2 13.27	1.9515	17 38 11.3	10.005	8	11 33 13.85	1.8616	8 23 58.5	12.843
9	10 4 10.27	1.9486	17 28 8.8	10.079	9	11 35 5.53	1.8611	8 11 6.7	12.885
10	10 6 7.09	1.9454	17 18 1.9	10.152	10	11 36 57.19	1.8608	7 58 12.3	12.928
11	10 8 3.72	1.9424	17 7 50.6	10.224	11	11 38 48.83	1.8604	7 45 15.4	12.969
12	10 10 0.17	1.9394	16 57 35.0	10.296	12	11 40 40.44	1.8600	7 32 16.0	13.011
13	10 11 56.45	1.9366	16 47 15.1	10.368	13	11 42 32.04	1.8600	7 19 14.1	13.053
14	10 13 52.56	1.9338	16 36 50.9	10.439	14	11 44 23.64	1.8600	7 6 9.7	13.093
15	10 15 48.51	1.9311	16 26 22.4	10.510	15	11 46 15.24	1.8600	6 53 2.9	13.133
16	10 17 44.29	1.9289	16 15 49.7	10.580	16	11 48 6.84	1.8600	6 39 53.8	13.171
17	10 19 39.90	1.9254	16 5 12.8	10.649	17	11 49 58.44	1.8600	6 26 42.4	13.209
18	10 21 35.34	1.9227	15 54 31.8	10.717	18	11 51 50.04	1.8601	6 13 28.7	13.247
19	10 23 30.62	1.9202	15 43 46.8	10.784	19	11 53 41.66	1.8605	6 0 12.8	13.284
20	10 25 25.76	1.9178	15 32 57.7	10.852	20	11 55 33.30	1.8606	5 46 54.7	13.320
21	10 27 20.75	1.9153	15 22 4.6	10.919	21	11 57 24.96	1.8612	5 33 34.5	13.355
22	10 29 15.59	1.9127	15 11 7.5	10.985	22	11 59 16.64	1.8616	5 20 12.2	13.390
23	10 31 10.28	1.9102	15 0 6.5	11.050	23	12 1 8.35	1.8621	5 6 47.8	13.423
24	10 33 4.82	1.9079	N.14 49 1.6	11.115	24	12 3 0.10	1.8627	N. 4 53 21.5	13.455

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
MONDAY 25.					WEDNESDAY 27.				
0	12 3 0.10	1.8627	N. 4 53 21.5	13.455	0	13 34 30.11	1.9790	S. 6 15 49.2	14.065
1	12 4 51.88	1.8634	4 39 53.2	13.489	1	13 36 28.98	1.9834	6 29 54.0	14.075
2	12 6 43.71	1.8641	4 26 22.9	13.522	2	13 38 28.12	1.9879	6 43 58.2	14.064
3	12 8 35.58	1.8649	4 12 50.6	13.553	3	13 40 27.53	1.9924	6 58 1.7	14.051
4	12 10 27.50	1.8658	3 59 16.5	13.583	4	13 42 27.21	1.9970	7 12 4.4	14.036
5	12 12 19.48	1.8668	3 45 40.7	13.611	5	13 44 27.16	2.0014	7 26 6.1	14.020
6	12 14 11.51	1.8678	3 32 3.2	13.639	6	13 46 27.38	2.0060	7 40 6.8	14.003
7	12 16 3.61	1.8689	3 18 24.0	13.668	7	13 48 27.88	2.0108	7 54 6.5	13.986
8	12 17 55.78	1.8701	3 4 43.1	13.695	8	13 50 28.68	2.0159	8 8 5.1	13.967
9	12 19 48.02	1.8714	2 51 0.6	13.722	9	13 52 29.79	2.0209	8 22 2.5	13.947
10	12 21 40.34	1.8727	2 37 16.5	13.748	10	13 54 31.19	2.0258	8 35 58.7	13.926
11	12 23 32.74	1.8740	2 23 30.9	13.773	11	13 56 32.89	2.0308	8 49 53.6	13.903
12	12 25 25.21	1.8753	2 9 43.8	13.797	12	13 58 34.89	2.0358	9 3 47.1	13.879
13	12 27 17.78	1.8770	1 55 55.3	13.820	13	14 0 37.19	2.0411	9 17 39.1	13.854
14	12 29 10.45	1.8787	1 42 5.4	13.842	14	14 2 39.82	2.0466	9 31 29.6	13.827
15	12 31 3.22	1.8804	1 28 14.2	13.864	15	14 4 42.78	2.0520	9 45 18.4	13.799
16	12 32 56.09	1.8821	1 14 21.7	13.886	16	14 6 46.06	2.0574	9 59 5.5	13.770
17	12 34 49.07	1.8839	1 0 27.9	13.908	17	14 8 49.66	2.0627	10 12 50.8	13.738
18	12 36 42.16	1.8858	0 46 32.8	13.928	18	14 10 53.59	2.0684	10 26 34.1	13.705
19	12 38 35.37	1.8878	0 32 36.6	13.946	19	14 12 57.86	2.0742	10 40 15.4	13.671
20	12 40 28.70	1.8898	0 18 39.3	13.964	20	14 15 2.48	2.0798	10 53 54.7	13.637
21	12 42 22.15	1.8920	N. 0 4 41.0	13.980	21	14 17 7.44	2.0855	11 7 31.9	13.601
22	12 44 15.73	1.8943	S. 0 9 18.3	13.997	22	14 19 12.75	2.0915	11 21 6.9	13.563
23	12 46 9.46	1.8967	S. 0 23 18.6	14.012	23	14 21 18.42	2.0975	S. 11 34 39.5	13.523
TUESDAY 26.					THURSDAY 28.				
0	12 48 3.33	1.8991	S. 0 37 19.7	14.025	0	14 23 24.44	2.1033	S. 11 48 9.7	13.489
1	12 49 57.34	1.9014	0 51 21.7	14.039	1	14 25 30.82	2.1094	12 1 37.4	13.441
2	12 51 51.50	1.9039	1 5 24.4	14.051	2	14 27 37.57	2.1157	12 15 2.6	13.396
3	12 53 45.81	1.9065	1 19 27.8	14.063	3	14 29 44.70	2.1220	12 28 25.2	13.353
4	12 55 40.28	1.9091	1 33 31.9	14.074	4	14 31 52.20	2.1282	12 41 45.0	13.306
5	12 57 34.91	1.9119	1 47 36.7	14.085	5	14 34 0.08	2.1344	12 55 2.0	13.259
6	12 59 29.71	1.9147	2 1 42.1	14.094	6	14 36 8.33	2.1408	13 8 16.1	13.209
7	13 1 24.68	1.9177	2 15 48.0	14.103	7	14 38 16.97	2.1474	13 21 27.1	13.158
8	13 3 19.83	1.9207	2 29 54.4	14.110	8	14 40 26.01	2.1539	13 34 35.0	13.106
9	13 5 15.16	1.9238	2 44 1.2	14.116	9	14 42 35.44	2.1604	13 47 39.8	13.052
10	13 7 10.68	1.9269	2 58 8.3	14.120	10	14 44 45.26	2.1670	14 0 41.3	12.995
11	13 9 6.39	1.9301	3 12 15.6	14.124	11	14 46 55.48	2.1738	14 13 39.2	12.936
12	13 11 2.29	1.9333	3 26 23.1	14.127	12	14 49 6.10	2.1804	14 26 33.6	12.877
13	13 13 58.39	1.9367	3 40 30.8	14.130	13	14 51 17.13	2.1872	14 39 24.4	12.817
14	13 14 54.70	1.9404	3 54 38.7	14.132	14	14 53 28.57	2.1941	14 52 11.6	12.755
15	13 16 51.23	1.9439	4 8 46.6	14.132	15	14 55 40.42	2.2010	15 4 55.0	12.690
16	13 18 47.97	1.9475	4 22 54.5	14.132	16	14 57 52.69	2.2080	15 17 34.5	12.625
17	13 20 44.92	1.9510	4 37 2.4	14.130	17	15 0 5.38	2.2150	15 30 10.0	12.557
18	13 22 42.09	1.9547	4 51 10.1	14.126	18	15 2 18.49	2.2221	15 42 41.4	12.487
19	13 24 39.49	1.9586	5 5 17.6	14.122	19	15 4 32.03	2.2292	15 55 8.5	12.415
20	13 26 37.13	1.9626	5 19 24.8	14.116	20	15 6 46.00	2.2363	16 7 31.2	12.340
21	13 28 35.01	1.9667	5 33 31.6	14.110	21	15 9 0.39	2.2434	16 19 49.4	12.265
22	13 30 33.13	1.9708	5 47 37.9	14.102	22	15 11 15.21	2.2507	16 32 3.1	12.190
23	13 32 31.50	1.9749	6 1 43.8	14.094	23	15 13 30.47	2.2580	16 44 12.3	12.115
24	13 34 30.11	1.9790	S. 6 15 49.2	14.085	24	15 15 46.17	2.2653	S. 16 56 16.9	12.037

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
FRIDAY 29.					SATURDAY 30.				
0	15 15 46.17	2.9653	S. 16° 56' 16.9	12.037	0	16 12 17.50	2.4455	S. 21° 17' 49.7	9.581
1	15 18 2.30	2.9796	17 8 16.7	11.955	1	16 14 44.45	2.4598	21 27 20.9	9.457
2	15 20 18.88	2.9801	17 20 11.5	11.871	2	16 17 11.84	2.4602	21 36 44.6	9.331
3	15 22 35.91	2.9875	17 32 1.3	11.787	3	16 19 39.68	2.4677	21 46 0.7	9.203
4	15 24 53.38	2.9949	17 43 46.0	11.701	4	16 22 7.96	2.4749	21 55 9.0	9.072
5	15 27 11.29	2.3022	17 55 25.5	11.614	5	16 24 36.67	2.4821	22 4 9.4	8.940
6	15 29 29.65	2.3097	18 6 59.6	11.522	6	16 27 5.81	2.4892	22 13 1.8	8.806
7	15 31 48.46	2.3173	18 18 28.2	11.429	7	16 29 35.38	2.4964	22 21 46.2	8.671
8	15 34 7.72	2.3248	18 29 51.1	11.334	8	16 32 5.38	2.5037	22 30 22.4	8.533
9	15 36 27.43	2.3323	18 41 8.3	11.238	9	16 34 35.82	2.5108	22 38 50.2	8.393
10	15 38 47.59	2.3398	18 52 19.7	11.141	10	16 37 6.68	2.5178	22 47 9.6	8.251
11	15 41 8.21	2.3475	19 3 25.2	11.042	11	16 39 37.95	2.5246	22 55 20.4	8.107
12	15 43 29.28	2.3549	19 14 24.7	10.940	12	16 42 9.62	2.5312	23 3 22.5	7.962
13	15 45 50.80	2.3625	19 25 18.1	10.838	13	16 44 41.70	2.5381	23 11 15.9	7.817
14	15 48 12.78	2.3701	19 36 5.3	10.733	14	16 47 14.20	2.5451	23 19 0.6	7.671
15	15 50 35.21	2.3777	19 46 46.1	10.627	15	16 49 47.11	2.5517	23 26 36.4	7.522
16	15 52 58.10	2.3852	19 57 20.6	10.520	16	16 52 20.41	2.5582	23 34 3.2	7.370
17	15 55 21.44	2.3929	20 7 48.5	10.409	17	16 54 54.09	2.5645	23 41 20.8	7.216
18	15 57 45.24	2.4004	20 18 9.7	10.296	18	16 57 28.15	2.5709	23 48 29.2	7.062
19	16 0 9.49	2.4079	20 28 24.1	10.181	19	17 0 2.59	2.5772	23 55 28.3	6.906
20	16 2 34.19	2.4154	20 38 31.5	10.065	20	17 2 37.41	2.5834	24 2 17.9	6.747
21	16 4 59.34	2.4229	20 48 31.9	9.947	21	17 5 12.60	2.5895	24 8 58.0	6.588
22	16 7 24.94	2.4304	20 58 25.1	9.827	22	17 7 48.15	2.5954	24 15 28.5	6.427
23	16 9 50.99	2.4380	21 8 11.1	9.705	23	17 10 24.05	2.6013	24 21 49.3	6.265
24	16 12 17.50	2.4455	S. 21° 17' 49.7	9.581	24	17 13 0.31	2.6071	S. 24° 28' 0.3	6.101

## PHASES OF THE MOON.

☾ First Quarter, . . . . .	d	h	m
○ Full Moon, . . . . .	14	17	8.5
☾ Last Quarter, . . . . .	22	17	45.3
● New Moon, . . . . .	30	6	34.7

☾ Perigee, . . . . .	d	h
☾ Apogee, . . . . .	21	5.9



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.		Noon.	P. L. of Diff.	HI <sup>b</sup> .	P. L. of Diff.	VI <sup>b</sup> .	P. L. of Diff.	IX <sup>b</sup> .	P. L. of Diff.
3	SUN	W.	28 51 3	2681	30 26 9	2673	32 5 25	2666	33 42 50	2660
	Saturn	E.	36 5 22	2394	34 21 38	2391	32 37 50	2388	30 53 58	2387
	α Aquilæ	E.	56 3 20	2655	54 45 45	2709	53 29 7	2768	52 13 31	2634
	Fomalhaut	E.	82 8 34	2519	80 27 47	2515	78 46 55	2512	77 5 58	2510
	α Pegasi	E.	101 0 40	2766	99 25 28	2756	97 50 2	2747	96 14 25	2739
4	SUN	W.	41 51 53	2635	43 30 1	2631	45 8 14	2627	46 46 32	2624
	Antares	W.	16 27 30	2441	18 10 6	2415	19 53 20	2384	21 37 3	2378
	Fomalhaut	E.	68 40 40	2507	66 59 36	2509	65 18 35	2512	63 37 38	2516
	α Pegasi	E.	88 14 12	2716	86 37 54	2714	85 1 33	2713	83 25 11	2713
5	SUN	W.	54 59 1	2612	56 37 40	2610	58 16 21	2609	59 55 4	2607
	Antares	W.	30 20 11	2333	32 5 23	2326	33 50 44	2322	35 36 12	2318
	Venus	W.	25 48 0	2684	27 25 1	2684	29 2 3	2682	30 39 7	2681
	Fomalhaut	E.	55 14 40	2550	53 34 36	2561	51 54 48	2574	50 15 18	2587
	α Pegasi	E.	75 23 51	2730	73 47 51	2737	72 12 0	2745	70 36 20	2754
6	SUN	W.	68 8 56	2605	69 47 44	2606	71 26 31	2606	73 5 18	2606
	Antares	W.	44 24 34	2307	46 10 23	2306	47 56 14	2305	49 42 6	2305
	Venus	W.	38 44 42	2679	40 21 50	2679	41 58 58	2680	43 36 5	2680
	Fomalhaut	E.	42 3 30	2694	40 26 42	2725	38 50 36	2761	37 15 17	2802
	α Pegasi	E.	62 41 37	2693	61 7 39	2649	59 34 5	2662	58 0 57	2666
	α Arietis	E.	103 50 29	2399	102 6 43	2391	100 22 56	2390	98 39 7	2390
7	SUN	W.	81 19 0	2611	82 57 40	2612	84 36 18	2614	86 14 54	2616
	Venus	W.	51 41 27	2685	53 18 27	2687	54 55 25	2688	56 32 20	2691
	Saturn	W.	20 36 41	2379	22 20 46	2373	24 5 0	2366	25 49 23	2368
	α Pegasi	E.	50 23 56	2646	48 54 40	2690	47 26 18	2761	45 58 55	2792
	α Arietis	E.	90 0 4	2393	88 16 19	2394	86 32 36	2396	84 46 55	2396
8	SUN	W.	94 27 15	2606	96 5 35	2609	97 43 51	2631	99 22 4	2633
	Venus	W.	64 36 20	2700	66 13 0	2703	67 49 36	2705	69 26 9	2708
	Saturn	W.	34 32 21	2355	36 17 1	2355	38 1 41	2355	39 46 20	2356
	α Pegasi	E.	39 0 32	2577	37 41 33	2687	36 24 32	2811	35 9 41	2855
	α Arietis	E.	76 11 30	2414	74 28 15	2418	72 45 6	2422	71 2 3	2427
	Aldebaran	E.	106 26 58	2399	104 41 41	2391	102 56 27	2322	101 11 16	2325
9	SUN	W.	107 32 14	2649	109 10 3	2652	110 47 48	2656	112 25 27	2659
	Venus	W.	77 27 56	2723	79 4 5	2727	80 40 9	2731	82 16 8	2734
	Saturn	W.	48 29 6	2365	50 13 31	2368	51 57 52	2371	53 42 9	2373
	α Aquilæ	W.	48 15 32	2619	49 26 53	2636	50 39 37	2657	51 53 40	2677
	α Arietis	E.	62 28 46	2458	60 46 34	2466	59 4 33	2475	57 22 44	2484
	Aldebaran	E.	92 26 12	2348	90 41 23	2352	88 56 39	2355	87 11 59	2359
10	SUN	W.	120 32 29	2679	122 9 37	2684	123 46 39	2689	125 23 34	2693
	Venus	W.	90 14 49	2754	91 50 17	2759	93 25 39	2768	95 0 54	2769
	Saturn	W.	62 22 29	2390	64 6 18	2394	65 50 2	2396	67 33 40	2403
	α Aquilæ	W.	58 20 0	2630	59 39 51	2492	61 0 24	2468	62 21 35	2498
	α Arietis	E.	48 57 12	2542	47 16 57	2556	45 37 2	2573	43 57 30	2592
	Aldebaran	E.	78 30 1	2378	76 45 55	2383	75 1 56	2387	73 18 3	2392
11	Venus	W.	102 55 30	2796	104 30 4	2801	106 4 30	2806	107 38 48	2815
	Saturn	W.	76 10 10	2426	77 53 7	2432	79 35 56	2438	81 18 37	2449
	α Aquilæ	W.	69 14 53	2391	70 38 40	2396	72 2 44	2394	73 27 3	2395
	Fomalhaut	W.	34 19 36	2947	35 50 55	2909	37 23 2	2876	38 55 51	2848

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
3	Sun W.	35 20 24	2654	36 58 6	2649	38 35 55	2643	40 13 51	2639
	Saturn E.	29 10 4	2386	27 26 9	2387	25 42 15	2389	23 58 24	2392
	α Aquilæ E.	50 59 4	2908	49 45 51	2988	48 34 0	4079	47 23 38	4183
	Fomalhaut E.	75 24 58	2507	73 43 55	2506	72 2 50	2506	70 21 45	2506
	α Pegasi E.	94 38 37	2733	93 2 41	2737	91 26 37	2722	89 50 27	2719
4	Sun W.	48 24 54	2621	50 3 21	2618	51 41 51	2615	53 20 25	2614
	Antares W.	23 21 9	2365	25 5 34	2355	26 50 14	2346	28 35 7	2338
	Fomalhaut E.	61 56 47	2520	60 16 2	2526	58 35 25	2533	56 54 57	2540
	α Pegasi E.	81 48 49	2715	80 12 29	2716	78 36 11	2720	76 59 58	2725
5	Sun W.	61 33 49	2607	63 12 35	2607	64 51 21	2606	66 30 8	2605
	Antares W.	37 21 45	2315	39 7 22	2313	40 53 3	2311	42 38 47	2309
	Venus W.	32 16 12	2680	33 53 19	2680	35 30 26	2679	37 7 34	2679
	Fomalhaut E.	48 36 5	2602	46 57 13	2620	45 18 45	2641	43 40 46	2666
	α Pegasi E.	69 0 52	2765	67 25 38	2776	65 50 39	2720	64 15 58	2605
6	Sun W.	74 44 5	2607	76 22 51	2608	78 1 35	2609	79 40 18	2610
	Antares W.	51 27 58	2304	53 13 51	2305	54 59 43	2305	56 45 35	2305
	Venus W.	45 13 12	2681	46 50 18	2682	48 27 22	2683	50 4 25	2684
	Fomalhaut E.	35 40 52	2648	34 7 27	2603	32 35 12	2668	31 4 19	3045
	α Pegasi E.	56 28 20	2612	54 56 16	2641	53 24 49	2672	51 54 1	3006
7	α Arietis E.	96 55 18	2389	95 11 28	2390	93 27 39	2391	91 43 51	2391
	Sun W.	87 53 27	2618	89 31 58	2619	91 10 27	2621	92 48 53	2624
	Venus W.	58 9 13	2692	59 46 4	2694	61 22 52	2695	62 59 37	2698
	Saturn W.	27 33 52	2359	29 18 25	2357	31 3 2	2355	32 47 41	2355
	α Pegasi E.	44 32 36	2352	43 7 28	2319	41 43 39	2385	40 21 17	2476
8	α Arietis E.	83 5 18	2401	81 21 44	2404	79 38 15	2407	77 54 50	2410
	Sun W.	101 0 14	2636	102 38 20	2639	104 16 22	2642	105 54 20	2645
	Venus W.	71 2 38	2710	72 39 3	2714	74 15 25	2716	75 51 43	2720
	Saturn W.	41 30 58	2357	43 15 34	2359	45 0 7	2361	46 44 38	2363
	α Pegasi E.	33 57 17	4119	32 47 34	4308	31 40 49	4527	30 37 21	4784
9	α Arietis E.	69 19 7	2433	67 36 19	2438	65 53 39	2445	64 11 8	2451
	Aldebaran E.	99 26 8	2337	97 41 3	2340	95 56 2	2343	94 11 5	2346
	Sun W.	114 3 2	2663	115 40 32	2667	117 17 56	2671	118 55 15	2675
	Venus W.	83 52 2	2738	85 27 52	2741	87 3 37	2746	88 39 16	2750
	Saturn W.	55 26 22	2376	57 10 31	2380	58 54 35	2382	60 38 35	2387
10	α Aquilæ W.	53 8 56	2725	54 25 17	2668	55 42 38	2617	57 0 54	3571
	α Arietis E.	55 41 8	2494	53 59 46	2504	52 18 38	2515	50 37 46	2528
	Aldebaran E.	85 27 25	2362	83 42 56	2366	81 58 32	2370	80 14 14	2373
	Sun W.	127 0 23	2698	128 37 5	2703	130 13 41	2709	131 50 9	2715
	Venus W.	96 36 3	2773	98 11 6	2779	99 46 1	2785	101 20 49	2789
11	Saturn W.	69 17 11	2407	71 0 36	2412	72 43 54	2416	74 27 6	2422
	α Aquilæ W.	63 43 20	2401	65 5 35	2377	66 28 18	2356	67 51 25	2338
	α Arietis E.	42 18 24	2612	40 39 45	2634	39 1 36	2659	37 24 1	2687
	Aldebaran E.	71 34 17	2398	69 50 39	2403	68 7 8	2408	66 23 45	2414
11	Venus W.	109 12 57	2621	110 46 58	2628	112 20 50	2635	113 54 33	2642
	Saturn W.	83 1 10	2450	84 43 34	2455	86 25 50	2462	88 7 57	2460
	α Aquilæ W.	74 51 32	2376	76 16 11	2370	77 40 57	2366	79 5 49	2362
	Fomalhaut W.	40 29 17	2694	42 3 14	2604	43 37 37	2786	45 12 23	2772

NAR DISTANCES.

			III <sup>b</sup> .	P. L. of Dist.	V <sup>b</sup> .	P. L. of Dist.	IX <sup>b</sup> .	P. L. of Dist.
		100	62 57 24	9495	61 14 27	9433	59 31 40	9449
		107	2 25	9403	105 18 54	9406	103 35 31	9414
		108	91 31 42	9463	93 13 19	9490	94 54 46	9497
		109	81 53 43	9560	83 20 41	9569	84 45 37	9565
		110	42 22 46	9751	49 58 18	9743	51 34 1	9737
		111	35 6 7	9858	36 18 28	9848	37 32 41	9750
		112	49 18 36	9489	47 37 7	9498	45 55 51	9506
		113	93 18 14	9453	91 35 54	9400	89 53 44	9467
		114	104 59 40	9547	106 39 48	9556	108 19 43	9565
		115	93 13 2	9312	94 37 0	9325	96 0 43	9338
		116	61 9 56	9799	62 45 57	9739	64 21 55	9734
		117	45 27 42	9375	46 50 27	9336	48 13 57	9303
		118	35 53 32	9540	34 14 10	9506	32 35 9	9512
		119	79 44 33	9516	78 3 42	9525	76 23 3	9534
		120	117 37 24	9559	115 57 33	9567	114 17 53	9576
		121	73 55 45	9767	75 30 56	9775	77 5 57	9789
		122	56 45 40	9183	58 12 10	9171	59 38 54	9183
		123	66 23 41	9592	64 44 35	9609	63 5 43	9613
		124	102 36 36	9602	100 57 44	9619	99 19 5	9623
		125	104 24 11	9639	102 45 59	9649	101 8 1	9659
		126	86 32 2	9840	88 5 38	9851	89 39 0	9863
		127	68 21 42	9144	69 48 58	9146	71 16 12	9148
		128	53 17 40	9679	51 40 32	9691	50 3 40	9703
		129	89 32 10	9687	87 55 12	9698	86 18 29	9710
		130	91 25 7	9718	89 48 49	9728	88 12 46	9739
		131	115 57 46	9879	114 25 0	9891	112 52 29	9901
		132	79 57 55	9163	81 24 26	9190	82 50 47	9196
		133	36 25 54	9054	37 55 0	9046	39 24 16	9046
		134	40 28 0	9775	38 53 0	9787	37 18 15	9800
		135	76 43 33	9779	75 8 38	9791	73 33 58	9803
		136	78 41 42	9808	77 7 25	9819	75 33 22	9831
		137	103 42 33	9973	102 11 46	9985	100 41 14	9997
		138	91 24 57	9361	92 49 54	9363	94 14 37	9366
		139	48 21 16	9035	49 50 45	9039	51 20 10	9042
		140	27 55 35	9878	26 22 48	9891	24 50 18	9906
		141	64 11 19	9473	62 38 26	9485	61 5 48	9496
		142	66 14 25	9201	64 42 7	9219	63 10 3	9224
		143	91 43 12	9067	90 14 22	9079	88 45 47	9090
		144	102 37 29	9370	104 1 20	9388	105 23 53	9400
		145	60 14 50	9073	61 43 33	9078	63 12 10	9084
		146	29 20 1	9030	30 49 37	9031	32 19 11	9034
		147	51 54 59	9963	50 24 0	9973	48 53 14	9984
		148	54 2 38	9289	52 32 11	9299	51 1 57	9302
		149	79 58 56	9155	78 31 53	9165	77 5 2	9174
		150	105 57 52	9959	104 26 48	9969	102 55 56	9978
		151	72 1 19	9119	73 29 6	9124	74 56 46	9130
		152	41 15 3	9058	42 44 4	9069	44 13 0	9077

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
11	Aldebaran E.	57° 49' 2"	2448	56° 6' 35"	2455	54° 24' 18"	2462	52° 42' 12"	2471
	Pollux E.	101 52 16	2420	100 9 10	2426	98 26 12	2432	96 43 23	2439
12	Saturn W.	96 36 3	2505	98 17 9	2513	99 58 4	2521	101 38 48	2530
	α Aquilæ W.	86 10 30	3270	87 35 17	3275	88 59 58	3282	90 24 30	3291
	Fomalhaut W.	53 9 52	2733	54 45 48	2730	56 21 48	2728	57 57 51	2728
	α Pegasi W.	38 48 35	3665	40 5 59	3589	41 24 45	3523	42 44 44	3486
	Aldebaran E.	44 14 49	2518	42 34 1	2530	40 53 29	2540	39 13 12	2553
	Pollux E.	88 11 45	2475	86 29 57	2482	84 48 19	2490	83 6 52	2499
13	Saturn W.	109 59 26	2574	111 38 56	2585	113 18 12	2594	114 57 15	2605
	α Aquilæ W.	97 24 10	3354	98 47 19	3371	100 10 9	3389	101 32 38	3409
	Fomalhaut W.	65 57 50	2738	67 33 40	2743	69 9 23	2749	70 44 58	2754
	α Pegasi W.	49 38 5	3276	51 2 45	3251	52 27 54	3229	53 53 29	3211
	Aldebaran E.	30 56 30	2629	29 18 15	2649	27 40 27	2671	26 3 8	2685
	Pollux E.	74 42 37	2543	73 2 23	2552	71 22 22	2562	69 42 35	2572
	Jupiter E.	112 38 25	2585	110 59 9	2593	109 20 5	2603	107 41 14	2612
14	Fomalhaut W.	78 40 48	2792	80 15 27	2800	81 49 55	2810	83 24 10	2819
	α Pegasi W.	61 5 48	3156	62 32 50	3151	63 59 58	3147	65 27 11	3145
	Pollux E.	61 27 6	2624	59 48 43	2635	58 10 35	2645	56 32 41	2657
	Regulus E.	97 40 40	2632	96 2 29	2643	94 24 33	2654	92 46 51	2664
	Jupiter E.	99 30 16	2662	97 52 45	2673	96 15 29	2684	94 38 27	2695
15	Fomalhaut W.	91 12 8	2873	92 45 1	2886	94 17 38	2898	95 49 59	2910
	α Pegasi W.	72 43 23	3152	74 10 30	3157	75 37 31	3161	77 4 27	3168
	Pollux E.	48 27 4	2715	46 50 44	2726	45 14 39	2738	43 38 50	2750
	Regulus E.	84 42 2	2720	83 5 49	2732	81 29 52	2744	79 54 10	2756
	Jupiter E.	86 36 58	2750	85 1 24	2762	83 26 6	2773	81 51 3	2785
	Mars E.	111 20 12	2914	109 48 11	2925	108 16 24	2937	106 44 52	2949
16	α Pegasi W.	84 16 58	3208	85 42 58	3217	87 8 47	3228	88 34 23	3238
	α Arietis W.	40 53 39	3036	42 23 7	3033	43 52 39	3032	45 22 12	3032
	Pollux E.	35 43 47	2812	34 9 35	2825	32 35 40	2838	31 2 2	2851
	Regulus E.	71 59 34	2814	70 25 24	2826	68 51 30	2838	67 17 51	2850
	Jupiter E.	73 59 35	2843	72 26 3	2855	70 52 46	2866	69 19 44	2878
	Mars E.	99 10 57	3009	97 40 55	3020	96 11 7	3032	94 41 34	3044
17	α Pegasi W.	95 39 5	3299	97 3 18	3313	98 27 15	3326	99 50 56	3340
	α Arietis W.	52 49 31	3046	54 18 47	3051	55 47 57	3056	57 17 1	3060
	Pollux E.	23 18 7	2921	21 46 15	2936	20 14 42	2953	18 43 30	2969
	Regulus E.	59 33 24	2908	58 1 15	2919	56 29 20	2930	54 57 39	2941
	Jupiter E.	61 38 14	2935	60 6 39	2946	58 35 18	2957	57 4 11	2968
	Mars E.	87 17 25	3101	85 49 17	3112	84 21 22	3124	82 53 41	3133
18	α Pegasi W.	106 45 9	3417	108 7 6	3434	109 28 44	3450	110 50 2	3469
	α Arietis W.	64 40 39	3090	66 9 1	3096	67 37 16	3101	69 5 24	3107
	Aldebaran W.	33 48 41	3038	35 18 7	3041	36 47 29	3045	38 16 46	3050
	Regulus E.	47 22 41	2995	45 52 22	3005	44 22 15	3015	42 52 21	3025
	Jupiter E.	49 31 56	3019	48 2 7	3030	46 32 31	3039	45 3 7	3047
	Mars E.	75 38 22	3184	74 11 54	3193	72 45 37	3202	71 19 30	3211
	Spica E.	101 25 16	2986	99 54 46	2995	98 24 27	3003	96 54 18	3012
19	α Arietis W.	76 24 19	3135	77 51 46	3140	79 19 7	3145	80 46 22	3149
	Aldebaran W.	45 41 50	3071	47 10 35	3076	48 39 14	3079	50 7 49	3083

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.		Noon.	P. L. of Diff.	III <sup>h</sup> .	P. L. of Diff.	VI <sup>h</sup> .	P. L. of Diff.	IX <sup>h</sup> .	P. L. of Diff.
11	Aldebaran	E.	64° 40' 30"	2420	62° 57' 24"	2426	61° 14' 27"	2433	59° 31' 40"	2440
	Pollux	E.	108 46 3	2398	107 2 25	2403	105 18 54	2408	103 35 31	2414
12	Saturn	W.	89 49 54	2475	91 31 42	2483	93 13 19	2490	94 54 46	2497
	α Aquilæ	W.	80 30 45	2300	81 55 43	2360	83 20 41	2362	84 45 37	2365
	Fomalhaut	W.	46 47 27	2761	48 22 46	2751	49 58 18	2743	51 34 1	2737
	α Pegasi	W.	33 55 51	2085	35 6 7	2058	36 18 28	2048	37 32 41	2035
	Aldebaran	E.	51 0 18	2480	49 18 36	2489	47 37 7	2498	45 55 51	2508
	Pollux	E.	95 0 44	2445	93 18 14	2453	91 35 54	2460	89 53 44	2467
13	Saturn	W.	103 19 20	2538	104 59 40	2547	106 39 48	2556	108 19 43	2565
	α Aquilæ	W.	91 48 52	2301	93 13 2	2312	94 37 0	2325	96 0 43	2338
	Fomalhaut	W.	59 33 54	2729	61 9 56	2729	62 45 57	2732	64 21 55	2734
	α Pegasi	W.	44 5 46	2418	45 27 42	2375	46 50 27	2336	48 13 57	2303
	Aldebaran	E.	37 33 13	2566	35 53 32	2580	34 14 10	2596	32 35 9	2612
	Pollux	E.	81 25 37	2507	79 44 33	2516	78 3 42	2525	76 23 3	2534
	Jupiter	E.	119 17 26	2551	117 37 24	2559	115 57 33	2567	114 17 53	2576
14	Fomalhaut	W.	72 20 26	2761	73 55 45	2767	75 30 56	2775	77 5 57	2782
	α Pegasi	W.	55 19 25	2195	56 45 40	2183	58 12 10	2171	59 38 54	2163
	Pollux	E.	68 3 1	2582	66 23 41	2592	64 44 35	2602	63 5 43	2613
	Regulus	E.	104 15 42	2592	102 36 36	2602	100 57 44	2612	99 19 5	2622
	Jupiter	E.	106 2 36	2622	104 24 11	2632	102 45 59	2642	101 8 1	2652
15	Fomalhaut	W.	84 58 13	2830	86 32 2	2840	88 5 38	2851	89 39 0	2862
	α Pegasi	W.	66 54 26	2144	68 21 42	2144	69 48 58	2146	71 16 12	2148
	Pollux	E.	54 55 3	2668	53 17 40	2679	51 40 32	2691	50 3 40	2703
	Regulus	E.	91 9 23	2675	89 32 10	2687	87 55 12	2698	86 18 29	2710
	Jupiter	E.	93 1 40	2705	91 25 7	2716	89 48 49	2728	88 12 46	2739
	Mars	E.	117 30 46	2868	115 57 46	2879	114 25 0	2891	112 52 29	2901
16	α Pegasi	W.	78 31 15	2174	79 57 55	2182	81 24 26	2190	82 50 47	2198
	α Arietis	W.	34 57 2	2065	36 25 54	2054	37 55 0	2046	39 24 16	2040
	Pollux	E.	42 3 17	2763	40 28 0	2775	38 53 0	2787	37 18 15	2800
	Regulus	E.	78 18 44	2767	76 43 33	2779	75 8 38	2791	73 33 58	2803
	Jupiter	E.	80 16 15	2796	78 41 42	2808	77 7 25	2819	75 33 22	2831
	Mars	E.	105 13 35	2961	103 42 33	2973	102 11 46	2985	100 41 14	2997
17	α Pegasi	W.	89 59 47	2250	91 24 57	2261	92 49 54	2283	94 14 37	2286
	α Arietis	W.	46 51 45	2034	48 21 16	2035	49 50 45	2039	51 20 10	2042
	Pollux	E.	29 28 40	2864	27 55 35	2878	26 22 48	2891	24 50 18	2906
	Regulus	E.	65 44 28	2861	64 11 19	2873	62 38 26	2885	61 5 48	2896
	Jupiter	E.	67 46 57	2890	66 14 25	2901	64 42 7	2912	63 10 3	2924
	Mars	E.	93 12 16	2956	91 43 12	2967	90 14 22	2979	88 45 47	2990
18	α Pegasi	W.	101 14 21	2355	102 37 29	2370	104 1 20	2386	105 23 53	2400
	α Arietis	W.	58 45 59	2066	60 14 50	2073	61 43 33	2078	63 12 10	2084
	Aldebaran	W.	27 50 25	2030	29 20 1	2030	30 49 37	2031	32 19 11	2034
	Regulus	E.	53 26 12	2952	51 54 59	2963	50 24 0	2973	48 53 14	2984
	Jupiter	E.	55 33 18	2978	54 2 38	2989	52 32 11	2999	51 1 57	3002
	Mars	E.	81 26 12	2144	79 58 56	2155	78 31 53	2165	77 5 2	2174
	Spica	E.	107 29 7	2950	105 57 52	2959	104 26 48	2969	102 55 56	2978
19	α Arietis	W.	70 33 25	2113	72 1 19	2119	73 29 6	2124	74 56 46	2130
	Aldebaran	W.	39 45 57	2054	41 15 3	2058	42 44 4	2062	44 13 0	2067

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.		Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
11	Aldebaran	E.	57° 49' 2"	2448	56° 6' 35"	2455	54° 24' 18"	2462	52° 42' 12"	2471
	Pollux	E.	101 52 16	2490	100 9 10	2496	98 26 12	2499	96 43 23	2439
12	Saturn	W.	96 36 3	2505	98 17 9	2513	99 58 4	2521	101 38 48	2530
	α Aquilæ	W.	86 10 30	3270	87 35 17	3275	88 59 58	3282	90 24 30	3291
	Fomalhaut	W.	53 9 52	2733	54 45 48	2730	56 21 48	2738	57 57 51	2738
	α Pegasi	W.	38 48 35	3665	40 5 59	3589	41 24 45	3523	42 44 44	3466
	Aldebaran	E.	44 14 49	2518	42 34 1	2530	40 53 29	2540	39 13 12	2553
	Pollux	E.	88 11 45	2475	86 29 57	2482	84 48 19	2490	83 6 52	2499
13	Saturn	W.	109 59 26	2574	111 38 56	2585	113 18 12	2594	114 57 15	2605
	α Aquilæ	W.	97 24 10	3354	98 47 19	3371	100 10 9	3389	101 32 38	3409
	Fomalhaut	W.	65 57 50	2738	67 33 40	2743	69 9 23	2749	70 44 58	2754
	α Pegasi	W.	49 38 5	3276	51 2 45	3251	52 27 54	3229	53 53 29	3211
	Aldebaran	E.	30 56 30	2629	29 18 15	2649	27 40 27	2671	26 3 8	2695
	Pollux	E.	74 42 37	2543	73 2 23	2552	71 22 22	2562	69 42 35	2572
	Jupiter	E.	112 38 25	2585	110 59 9	2593	109 20 5	2603	107 41 14	2612
14	Fomalhaut	W.	78 40 48	2792	80 15 27	2800	81 49 55	2810	83 24 10	2819
	α Pegasi	W.	61 5 48	3156	62 32 50	3151	63 59 58	3147	65 27 11	3145
	Pollux	E.	61 27 6	2624	59 48 43	2635	58 10 35	2645	56 32 41	2657
	Regulus	E.	97 40 40	2632	96 2 29	2643	94 24 33	2654	92 46 51	2664
	Jupiter	E.	99 30 16	2662	97 52 45	2673	96 15 29	2684	94 38 27	2695
15	Fomalhaut	W.	91 12 8	2873	92 45 1	2886	94 17 38	2898	95 49 59	2910
	α Pegasi	W.	72 43 23	3152	74 10 30	3157	75 37 31	3161	77 4 27	3168
	Pollux	E.	48 27 4	2715	46 50 44	2726	45 14 39	2738	43 38 50	2750
	Regulus	E.	84 42 2	2720	83 5 49	2732	81 29 52	2744	79 54 10	2756
	Jupiter	E.	86 36 58	2750	85 1 24	2762	83 26 6	2773	81 51 3	2785
	Mars	E.	111 20 12	2914	109 48 11	2925	108 16 24	2937	106 44 52	2949
16	α Pegasi	W.	84 16 58	3208	85 42 58	3217	87 8 47	3228	88 34 23	3238
	α Arietis	W.	40 53 39	3036	42 23 7	3033	43 52 39	3039	45 22 12	3032
	Pollux	E.	35 43 47	2812	34 9 35	2825	32 35 40	2838	31 2 2	2851
	Regulus	E.	71 59 34	2814	70 25 24	2826	68 51 30	2838	67 17 51	2850
	Jupiter	E.	73 59 35	2843	72 26 3	2855	70 52 46	2866	69 19 44	2878
	Mars	E.	99 10 57	3009	97 40 55	3020	96 11 7	3032	94 41 34	3044
17	α Pegasi	W.	95 39 5	3299	97 3 18	3313	98 27 15	3326	99 50 56	3340
	α Arietis	W.	52 49 31	3046	54 18 47	3051	55 47 57	3056	57 17 1	3060
	Pollux	E.	23 18 7	2921	21 46 15	2936	20 14 42	2953	18 43 30	2969
	Regulus	E.	59 33 24	2908	58 1 15	2919	56 29 20	2930	54 57 39	2941
	Jupiter	E.	61 38 14	2935	60 6 39	2946	58 35 18	2957	57 4 11	2968
	Mars	E.	87 17 25	3101	85 49 17	3112	84 21 22	3124	82 53 41	3133
18	α Pegasi	W.	106 45 9	3417	108 7 6	3434	109 28 44	3452	110 50 2	3469
	α Arietis	W.	64 40 39	3090	66 9 1	3096	67 37 16	3101	69 5 24	3107
	Aldebaran	W.	33 48 41	3038	35 18 7	3041	36 47 29	3045	38 16 46	3050
	Regulus	E.	47 22 41	2995	45 52 22	3005	44 22 15	3015	42 52 21	3025
	Jupiter	E.	49 31 56	3019	48 2 7	3030	46 32 31	3039	45 3 7	3047
	Mars	E.	75 38 22	3184	74 11 54	3193	72 45 37	3202	71 19 30	3211
	Spica	E.	101 25 16	2998	99 54 46	2995	98 24 27	3003	96 54 18	3012
19	α Arietis	W.	76 24 19	3135	77 51 46	3140	79 19 7	3145	80 46 22	3149
	Aldebaran	W.	45 41 50	3071	47 10 35	3078	48 39 14	3079	50 7 49	3083

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Diff.	III <sup>h</sup> .	P. L. of Diff.	VI <sup>h</sup> .	P. L. of Diff.	IX <sup>h</sup> .	P. L. of Diff.
19	Regulus E.	41° 22' 39"	3035	39° 53' 10"	3045	38° 23' 53"	3056	36° 54' 49"	3085
	Jupiter E.	43 33 53	3058	42 4 52	3087	40 36 2	3076	39 7 23	3085
	Mars E.	69 53 34	3220	68 27 48	3227	67 2 11	3226	65 36 44	3242
	Spica E.	95 24 20	3090	93 54 32	3037	92 24 53	3034	90 55 23	3041
	SUN E.	130 38 44	3379	129 16 3	3387	127 53 32	3385	126 31 10	3403
20	α Arietis W.	82 13 32	3154	83 40 36	3158	85 7 36	3162	86 34 31	3165
	Aldebaran W.	51 36 19	3087	53 4 45	3090	54 33 7	3093	56 1 25	3096
	Regulus E.	29 32 32	3117	28 4 43	3128	26 37 7	3140	25 9 46	3154
	Jupiter E.	31 46 50	3129	30 19 15	3138	28 51 52	3148	27 24 40	3157
	Mars E.	58 31 28	3274	57 6 46	3279	55 42 10	3283	54 17 39	3288
	Spica E.	83 29 52	3071	82 1 7	3075	80 32 27	3080	79 3 53	3083
	SUN E.	119 41 20	3433	118 19 41	3438	116 58 8	3443	115 36 40	3448
21	α Arietis W.	93 48 12	3178	95 14 48	3179	96 41 22	3180	98 7 55	3182
	Aldebaran W.	63 22 17	3103	64 50 23	3104	66 18 28	3104	67 46 33	3103
	Pollux W.	19 8 51	3119	20 36 37	3114	22 4 30	3110	23 32 28	3105
	Mars E.	47 16 12	3303	45 52 4	3304	44 27 57	3306	43 3 52	3306
	Spica E.	71 42 5	3098	70 13 53	3099	68 45 42	3101	67 17 33	3101
	SUN E.	108 50 30	3463	107 29 23	3463	106 8 17	3463	104 47 12	3463
22	α Arietis W.	105 20 29	3181	106 47 1	3180	108 13 34	3178	109 40 9	3177
	Aldebaran W.	75 7 17	3094	76 35 34	3091	78 3 54	3087	79 32 19	3084
	Pollux W.	30 53 21	3088	32 21 45	3084	33 50 14	3079	35 18 49	3075
	Mars E.	36 3 31	3304	34 39 24	3302	33 15 15	3300	31 51 4	3298
	Spica E.	59 56 49	3096	58 28 36	3096	57 0 21	3093	55 32 3	3091
	SUN E.	98 1 38	3456	96 40 25	3454	95 19 9	3450	93 57 49	3446
23	Aldebaran W.	86 55 46	3057	88 24 48	3050	89 53 59	3043	91 23 19	3035
	Pollux W.	42 43 21	3044	44 12 39	3037	45 42 6	3030	47 11 42	3022
	Spica E.	48 9 34	3072	46 40 50	3067	45 12 0	3062	43 43 4	3056
	SUN E.	87 9 46	3417	85 47 49	3409	84 25 43	3401	83 3 28	3393
24	Aldebaran W.	98 52 31	2990	100 22 56	2980	101 53 34	2969	103 24 25	2959
	Pollux W.	54 42 26	2974	56 13 11	2964	57 44 9	2953	59 15 21	2941
	Regulus W.	18 58 8	3104	20 26 13	3077	21 54 51	3059	23 24 0	3048
	Jupiter W.	16 20 10	3145	17 47 25	3113	19 15 19	3084	20 43 48	3057
	Spica E.	36 16 38	3027	34 46 59	3022	33 17 13	3017	31 47 21	3012
	SUN E.	76 9 40	3344	74 46 19	3333	73 22 46	3321	71 58 59	3308
25	Pollux W.	66 55 11	2878	68 27 58	2865	70 1 2	2851	71 34 24	2837
	Regulus W.	30 56 31	2928	32 28 14	2910	34 0 20	2893	35 32 48	2875
	Jupiter W.	28 13 33	2951	29 44 47	2933	31 16 25	2914	32 48 26	2897
	SUN E.	64 56 18	3242	63 30 58	3226	62 5 20	3212	60 39 25	3196
26	Pollux W.	79 25 57	2762	81 1 15	2746	82 26 54	2731	84 12 53	2714
	Regulus W.	43 20 47	2788	44 55 30	2771	46 30 36	2753	48 6 5	2737
	Jupiter W.	40 34 10	2806	42 8 27	2791	43 43 7	2773	45 18 10	2756
	SUN E.	53 25 6	3115	51 57 15	3099	50 29 4	3082	49 0 32	3065
27	Pollux W.	92 18 14	2633	93 56 24	2616	95 34 57	2600	97 13 52	2584
	Regulus W.	56 9 13	2650	57 47 0	2632	59 25 11	2615	61 3 45	2598
	Jupiter W.	53 19 14	2668	54 56 37	2651	56 34 23	2633	58 12 33	2615
	Mars W.	22 56 21	2858	24 29 34	2836	26 3 15	2816	27 37 22	2796
	SUN E.	41 32 29	2977	40 1 47	2958	38 30 42	2941	36 59 15	2923

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
19	Regulus E.	35° 25' 57"	3075	33° 57' 17"	3086	32° 28' 50"	3096	31° 0' 35"	3105
	Jupiter E.	37 38 55	3094	36 10 38	3109	34 42 31	3111	33 14 35	3120
	Mars E.	64 11 25	3250	62 46 15	3256	61 21 12	3263	59 56 17	3268
	Spica E.	89 26 1	3048	87 56 48	3054	86 27 42	3060	84 58 44	3065
	Sun E.	125 8 57	3410	123 46 52	3416	122 24 54	3423	121 3 4	3429
20	α Arietis W.	88 1 22	3168	89 28 9	3171	90 54 53	3173	92 21 34	3176
	Aldebaran W.	57 29 40	3098	58 57 52	3100	60 26 2	3101	61 54 10	3102
	Regulus E.	23 42 42	3168	22 15 55	3166	20 49 29	3204	19 23 25	3226
	Jupiter E.	25 57 39	3168	24 30 51	3179	23 4 17	3192	21 37 58	3204
	Mars E.	52 53 14	3292	51 28 53	3295	50 4 36	3299	48 40 23	3300
	Spica E.	77 35 23	3087	76 6 58	3091	74 38 37	3094	73 10 20	3096
	Sun E.	114 15 18	3453	112 54 1	3456	111 32 48	3459	110 11 38	3461
21	α Arietis W.	99 34 26	3189	101 0 57	3183	102 27 27	3182	103 53 58	3182
	Aldebaran W.	69 14 39	3108	70 42 46	3101	72 10 54	3100	73 39 4	3097
	Pollux W.	25 0 31	3102	26 28 38	3100	27 56 48	3096	29 25 2	3092
	Mars E.	41 39 48	3307	40 15 45	3306	38 51 41	3306	37 27 37	3305
	Spica E.	65 49 25	3101	64 21 17	3101	62 53 9	3101	61 25 0	3099
	Sun E.	103 26 7	3463	102 5 2	3463	100 43 56	3461	99 22 48	3459
22	α Arietis W.	111 6 46	3175	112 33 25	3173	114 0 7	3171	115 26 51	3168
	Aldebaran W.	81 0 48	3079	82 29 23	3074	83 58 4	3069	85 26 51	3063
	Pollux W.	36 47 29	3069	38 16 16	3064	39 45 10	3057	41 14 12	3052
	Mars E.	30 26 50	3296	29 2 34	3293	27 38 14	3290	26 13 51	3287
	Spica E.	54 3 42	3087	52 35 17	3083	51 6 47	3080	49 38 13	3076
	Sun E.	92 36 24	3441	91 14 54	3436	89 53 18	3431	88 31 36	3423
23	Aldebaran W.	92 52 48	3027	94 22 27	3018	95 52 17	3009	97 22 18	3000
	Pollux W.	48 41 28	3013	50 11 25	3003	51 41 34	2994	53 11 54	2985
	Spica E.	42 14 1	3051	40 44 51	3045	39 15 34	3039	37 46 10	3033
	Sun E.	81 41 4	3385	80 18 30	3375	78 55 45	3365	77 32 48	3355
24	Aldebaran W.	104 55 29	2947	106 26 48	2936	107 58 21	2924	109 30 10	2912
	Pollux W.	60 46 48	2929	62 18 30	2917	63 50 27	2904	65 22 41	2891
	Regulus W.	24 53 38	3005	26 23 44	2985	27 54 15	2965	29 25 11	2946
	Jupiter W.	22 12 50	3034	23 42 21	3011	25 12 20	2990	26 42 45	2972
	Spica E.	30 17 23	3008	28 47 20	3005	27 17 13	3002	25 47 3	3001
	Sun E.	70 34 57	3296	69 10 41	3282	67 46 9	3270	66 21 22	3255
25	Pollux W.	73 8 4	2922	74 42 3	2908	76 16 21	2792	77 50 59	2777
	Regulus W.	37 5 39	2858	38 38 52	2840	40 12 28	2823	41 46 26	2805
	Jupiter W.	34 20 49	2879	35 53 35	2861	37 26 44	2843	39 0 16	2826
	Sun E.	59 13 11	3181	57 46 49	3164	56 19 57	3148	54 52 46	3133
26	Pollux W.	85 49 14	2908	87 25 56	2882	89 3 0	2866	90 40 26	2849
	Regulus W.	49 41 56	2719	51 18 10	2701	52 54 48	2684	54 31 49	2667
	Jupiter W.	46 53 36	2738	48 29 25	2720	50 5 38	2703	51 42 14	2685
	Sun E.	47 31 39	3047	46 2 24	3030	44 32 48	3011	43 2 49	2994
27	Pollux W.	98 53 9	2567	100 32 49	2551	102 12 51	2535	103 53 16	2519
	Regulus W.	62 42 43	2581	64 22 4	2564	66 1 48	2548	67 41 55	2531
	Jupiter W.	59 51 7	2599	61 30 4	2581	63 9 25	2565	64 49 8	2548
	Mars W.	29 11 56	2775	30 46 56	2756	32 22 22	2737	33 58 13	2719
	Sun E.	35 27 25	2905	33 55 13	2887	32 22 38	2870	30 49 41	2852



## AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S						Sidereal Time of the Semi-diameter passing the Merid-iau.	Equation of Time, to be subtracted from		Diff. for 1 hour.
		Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Semi-diameter.	added to Apparent Time.				
Sun.	1	<sup>h</sup> 16 <sup>m</sup> 31 <sup>s</sup> 58.73	10.819	S. 21° 54' 55".1	22.72	16' 16".06	70.35	<sup>m</sup> 10 <sup>s</sup> 35.29	0.961		
Mon.	2	16 36 18.74	10.845	22 3 47.5	21.65	16 16.21	70.43	10 11.91	0.986		
Tues.	3	16 40 39.35	10.869	22 12 14.4	20.58	16 16.35	70.51	9 47.91	1.010		
Wed.	4	16 45 0.53	10.894	22 20 15.5	19.49	16 16.49	70.58	9 23.35	1.035		
Thur.	5	16 49 22.26	10.917	22 27 50.4	18.39	16 16.63	70.64	8 58.25	1.058		
Frid.	6	16 53 44.50	10.938	22 34 58.8	17.29	16 16.76	70.73	8 32.64	1.079		
Sat.	7	16 58 7.24	10.957	22 41 40.8	16.18	16 16.89	70.81	8 6.53	1.098		
Sun.	8	17 2 30.43	10.975	22 47 55.9	15.07	16 17.01	70.87	7 39.97	1.116		
Mon.	9	17 6 54.05	10.993	22 53 44.1	13.94	16 17.13	70.93	7 12.98	1.134		
Tues.	10	17 11 18.07	11.009	22 59 5.0	12.80	16 17.26	70.98	6 45.59	1.150		
Wed.	11	17 15 42.47	11.023	23 3 58.6	11.66	16 17.37	71.03	6 17.82	1.164		
Thur.	12	17 20 7.21	11.057	23 8 24.7	10.51	16 17.47	71.08	5 49.72	1.178		
Frid.	13	17 24 32.28	11.049	23 12 23.2	9.35	16 17.57	71.12	5 21.29	1.190		
Sat.	14	17 28 57.65	11.062	23 15 54.0	8.19	16 17.66	71.16	4 52.56	1.203		
Sun.	15	17 33 23.28	11.072	23 18 56.8	7.03	16 17.74	71.19	4 23.57	1.213		
Mon.	16	17 37 49.15	11.081	23 21 31.6	5.87	16 17.82	71.23	3 54.35	1.222		
Tues.	17	17 42 15.22	11.090	23 23 38.4	4.69	16 17.89	71.25	3 24.92	1.230		
Wed.	18	17 46 41.46	11.097	23 25 17.1	3.52	16 17.97	71.27	2 55.32	1.237		
Thur.	19	17 51 7.84	11.102	23 26 27.7	2.35	16 18.03	71.28	2 25.58	1.242		
Frid.	20	17 55 34.34	11.106	23 27 10.0	-1.17	16 18.08	71.29	1 55.72	1.246		
Sat.	21	18 0 0.94	11.110	23 27 24.0	0.00	16 18.13	71.30	1 25.77	1.250		
Sun.	22	18 4 27.56	11.112	23 27 9.7	+1.18	16 18.17	71.30	0 55.78	1.252		
Mon.	23	18 8 54.20	11.111	23 26 27.2	2.36	16 18.21	71.30	0 25.77	1.251		
Tues.	24	18 13 20.84	11.110	23 25 16.5	3.54	16 18.24	71.29	0 4.21	1.250		
Wed.	25	18 17 47.42	11.107	23 23 37.5	4.72	16 18.27	71.28	0 34.15	1.247		
Thur.	26	18 22 13.90	11.102	23 21 30.3	5.89	16 18.31	71.26	1 3.99	1.242		
Frid.	27	18 26 40.26	11.096	23 18 54.8	7.06	16 18.33	71.25	1 33.71	1.236		
Sat.	28	18 31 6.45	11.088	23 15 51.1	8.23	16 18.35	71.22	2 3.26	1.228		
Sun.	29	18 35 32.44	11.078	23 12 19.4	9.41	16 18.36	71.19	2 32.62	1.218		
Mon.	30	18 39 58.18	11.068	23 8 19.9	10.57	16 18.37	71.15	3 1.73	1.208		
Tues.	31	18 44 23.64	11.056	23 3 52.5	11.73	16 18.37	71.11	3 30.56	1.196		
Wed.	32	18 48 48.80	11.042	S. 22 58 57.4	12.88	16 18.37	71.06	3 59.08	1.182		

NOTE.—Mean Time of the Semidiameter passing may be found by subtracting 0s.19 from the Sidereal Time

## AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S					Equation of Time, to be added to		Diff. for 1 hour.	Sidereal Time or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	subtracted from Mean Time.				
						m	s			
Sun.	1	h m s 16 32 0.64	10.817	S. 21° 54' 59.1"	22.71	m s 10 35.13	0.961	h m s 16 42 35.77		
Mon.	2	16 36 20.58	10.842	22 3 51.2	21.64	10 11.75	0.966	16 46 32.33		
Tues.	3	16 40 41.12	10.866	22 12 17.8	20.57	9 47.77	1.010	16 50 28.89		
Wed.	4	16 45 2.23	10.891	22 20 18.5	19.48	9 23.21	1.035	16 54 25.44		
Thur.	5	16 49 23.89	10.914	22 27 53.1	18.38	8 58.11	1.058	16 58 22.00		
Frid.	6	16 53 46.06	10.935	22 35 1.3	17.28	8 32.50	1.079	17 2 18.56		
Sat.	7	16 58 8.72	10.954	22 41 43.0	16.17	8 6.40	1.098	17 6 15.12		
Sun.	8	17 2 31.83	10.972	22 47 57.9	15.06	7 39.85	1.116	17 10 11.68		
Mon.	9	17 6 55.37	10.990	22 53 45.8	13.93	7 12.86	1.134	17 14 8.23		
Tues.	10	17 11 19.31	11.006	22 59 6.5	12.79	6 45.48	1.150	17 18 4.79		
Wed.	11	17 15 43.63	11.020	23 3 59.8	11.65	6 17.72	1.164	17 22 1.35		
Thur.	12	17 20 8.29	11.034	23 8 25.7	10.50	5 49.62	1.178	17 25 57.91		
Frid.	13	17 24 33.27	11.046	23 12 24.0	9.34	5 21.20	1.190	17 29 54.47		
Sat.	14	17 28 58.55	11.059	23 15 54.6	8.18	4 52.46	1.203	17 33 51.02		
Sun.	15	17 33 24.09	11.069	23 18 57.3	7.02	4 23.49	1.213	17 37 47.58		
Mon.	16	17 37 49.87	11.078	23 21 32.0	5.86	3 54.27	1.222	17 41 44.14		
Tues.	17	17 42 15.84	11.086	23 23 38.7	4.69	3 24.86	1.230	17 45 40.70		
Wed.	18	17 46 42.00	11.093	23 25 17.3	3.52	2 55.26	1.237	17 49 37.26		
Thur.	19	17 51 8.29	11.098	23 26 27.8	2.35	2 25.53	1.242	17 53 33.82		
Frid.	20	17 55 34.70	11.102	23 27 10.0	-1.17	1 55.68	1.246	17 57 30.38		
Sat.	21	18 0 1.20	11.106	23 27 24.0	0.00	1 25.74	1.250	18 1 26.94		
Sun.	22	18 4 27.73	11.108	23 27 9.7	+1.18	0 55.77	1.252	18 5 23.50		
Mon.	23	18 8 54.28	11.107	23 26 27.2	2.36	0 25.77	1.251	18 9 20.05		
Tues.	24	18 13 20.82	11.106	23 25 16.5	3.54	0 4.21	1.250	18 13 16.61		
Wed.	25	18 17 47.31	11.103	23 23 37.6	4.72	0 34.16	1.247	18 17 13.17		
Thur.	26	18 22 13.70	11.098	23 21 30.4	5.89	1 3.97	1.242	18 21 9.73		
Frid.	27	18 26 39.97	11.092	23 18 55.0	7.06	1 33.68	1.236	18 25 6.29		
Sat.	28	18 31 6.07	11.084	23 15 51.4	8.23	2 3.22	1.228	18 29 2.85		
Sun.	29	18 35 31.97	11.074	23 12 19.8	9.41	2 32.57	1.218	18 32 59.40		
Mon.	30	18 39 57.62	11.064	23 8 20.4	10.57	3 1.66	1.208	18 36 55.96		
Tues.	31	18 44 23.00	11.052	23 3 53.2	11.72	3 30.48	1.196	18 40 52.52		
Wed.	32	18 48 48.07	11.038	S. 22° 58' 58.2"	12.87	3 58.99	1.182	18 44 49.08		

NOTE.—The Semidiameter for Mean Noon may be assumed the same as that for Apparent Noon.

Diff. for 1 hour  
+9".8565

AT GREENWICH MEAN NOON.											
Day of the Month.	Day of the Year.	THE SUN'S					Logarithm of the Radius Vector of the Earth.	Diff. for 1 hour.	Mean Time of Sidereal Oh.		
		True LONGITUDE.		Diff. for 1 hour.	LATITUDE.						
		$\lambda$	$\lambda'$								
1	336	249° 40' 17.7	39' 47.7	152.25	−0.22	9.9936990	−27.5	<sup>h</sup> 7 <sup>m</sup> 16 <sup>s</sup> 12.56			
2	337	250 41 12.1	40 41.9	152.29	0.35	.9936334	27.0	7 12 16.65			
3	338	251 42 7.5	41 37.1	152.33	0.44	.9935692	26.4	7 8 20.74			
4	339	252 43 3.8	42 33.2	152.36	0.52	.9935064	25.8	7 4 24.83			
5	340	253 44 0.8	43 30.0	152.39	0.58	.9934453	25.1	7 0 28.91			
6	341	254 44 58.6	44 27.6	152.42	0.59	.9933859	24.4	6 56 33.00			
7	342	255 45 57.0	45 25.9	152.45	0.58	.9933283	23.6	6 52 37.09			
8	343	256 46 56.0	46 24.7	152.47	0.54	.9932727	22.7	6 48 41.18			
9	344	257 47 55.6	47 24.2	152.50	0.47	.9932193	21.7	6 44 45.27			
10	345	258 48 55.8	48 24.2	152.52	0.38	.9931682	20.7	6 40 49.36			
11	346	259 49 56.5	49 24.7	152.54	0.28	.9931195	19.7	6 36 53.45			
12	347	260 50 57.7	50 25.7	152.56	0.16	.9930732	18.7	6 32 57.54			
13	348	261 51 59.5	51 27.3	152.58	−0.03	.9930296	17.6	6 29 1.63			
14	349	262 53 1.9	52 29.5	152.61	+0.10	.9929887	16.5	6 25 5.72			
15	350	263 54 4.9	53 32.3	152.63	0.23	.9929505	15.4	6 21 9.81			
16	351	264 55 8.5	54 35.7	152.66	0.33	.9929151	14.2	6 17 13.90			
17	352	265 56 12.8	55 39.9	152.69	0.42	.9928825	13.1	6 13 17.98			
18	353	266 57 17.8	56 44.7	152.72	0.48	.9928526	11.9	6 9 22.06			
19	354	267 58 23.5	57 50.2	152.75	0.52	.9928253	10.8	6 5 26.15			
20	355	268 59 29.9	58 56.4	152.78	0.53	.9928006	9.7	6 1 30.24			
21	356	270 0 37.0	0 3.3	152.81	0.50	.9927784	8.7	5 57 34.31			
22	357	271 1 44.8	1 10.9	152.84	0.44	.9927586	7.8	5 53 38.40			
23	358	272 2 53.2	2 19.1	152.87	0.36	.9927410	6.9	5 49 42.49			
24	359	273 4 2.2	3 27.9	152.89	0.26	.9927256	6.0	5 45 46.58			
25	360	274 5 11.8	4 37.3	152.91	+0.13	.9927121	5.2	5 41 50.66			
26	361	275 6 21.9	5 47.2	152.93	0.00	.9927005	4.4	5 37 54.75			
27	362	276 7 32.4	6 57.6	152.95	−0.13	.9926908	3.7	5 33 58.84			
28	363	277 8 43.3	8 8.3	152.96	0.26	.9926829	3.0	5 30 2.92			
29	364	278 9 54.5	9 19.3	152.97	0.38	.9926766	2.3	5 26 7.01			
30	365	279 11 5.7	10 30.3	152.97	0.49	.9926719	1.6	5 22 11.10			
31	366	280 12 16.9	11 41.3	152.97	0.58	.9926689	0.9	5 18 15.19			
32	367	281 13 28.1	12 52.3	152.97	−0.64	9.9926677	−0.1	5 14 19.27			
NOTE: $\lambda$ corresponds to the true equinox of the date, $\lambda'$ to the mean equinox of January 0d.								Diff. for 1 hour −9°.5296			

## GREENWICH MEAN TIME.

## THE MOON'S

Day of the Month.

## SEMI-DIAMETER.

## HORIZONTAL PARALLAX.

## MERIDIAN PASSAGE.

## AGE.

Noon.

Midnight.

Noon.

Diff. for  
1 hour.

Midnight.

Diff. for  
1 hour.Diff. for  
1 hour.

Noon.

Day of the Month.	SEMI-DIAMETER.		HORIZONTAL PARALLAX.				MERIDIAN PASSAGE.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 hour.	Midnight.	Diff. for 1 hour.			
1	16 17.0	16 20.0	59 39.1	+1.06	59 50.2	+0.80	<sup>h</sup> 0 <sup>m</sup> 31.7	<sup>m</sup> 2.55	<sup>d</sup> 0.7
2	16 22.2	16 23.5	59 58.2	+0.53	60 2.9	+0.26	1 34.4	2.65	1.7
3	16 23.9	16 23.5	60 4.4	-0.00	60 2.9	-0.25	2 38.2	2.63	2.7
4	16 22.3	16 20.4	59 58.6	0.47	59 51.6	0.67	3 40.2	2.50	3.7
5	16 17.9	16 14.9	59 42.5	0.84	59 31.6	0.97	4 38.6	2.34	4.7
6	16 11.6	16 7.9	59 19.2	1.08	59 5.8	1.16	5 32.6	2.17	5.7
7	16 3.8	16 0.0	58 51.5	1.22	58 36.6	1.25	6 22.8	2.03	6.7
8	15 55.6	15 51.7	58 21.5	1.26	58 6.1	1.26	7 10.4	1.95	7.7
9	15 47.5	15 43.3	57 50.7	1.26	57 35.4	1.26	7 56.6	1.97	8.7
10	15 39.2	15 35.0	57 20.2	1.27	57 5.0	1.26	8 42.5	1.93	9.7
11	15 31.0	15 26.9	56 50.0	1.24	56 35.2	1.23	9 29.3	1.98	10.7
12	15 23.0	15 19.0	56 20.6	1.21	56 6.3	1.18	10 17.7	2.06	11.7
13	15 15.2	15 11.5	55 52.2	1.16	55 38.4	1.13	11 7.9	2.13	12.7
14	15 7.8	15 4.3	55 25.1	1.09	55 12.2	1.05	11 59.7	2.17	13.7
15	15 1.0	14 57.9	55 0.0	0.99	54 48.6	0.91	12 52.1	2.17	14.7
16	14 55.0	14 52.5	54 38.1	0.83	54 28.7	0.73	13 43.9	2.12	15.7
17	14 50.3	14 48.4	54 20.6	0.62	54 13.9	0.49	14 33.9	2.03	16.7
18	14 47.1	14 46.2	54 8.8	0.35	54 5.5	-0.19	15 21.5	1.93	17.7
19	14 45.8	14 46.0	54 4.2	-0.02	54 5.1	+0.17	16 6.7	1.83	18.7
20	14 46.9	14 48.4	54 8.3	+0.36	54 13.9	0.56	16 49.6	1.76	19.7
21	14 50.6	14 53.5	54 21.8	0.77	54 32.3	0.98	17 31.1	1.72	20.7
22	14 57.0	15 1.3	54 45.4	1.19	55 1.0	1.40	18 12.2	1.72	21.7
23	15 6.2	15 11.8	55 19.1	1.61	55 39.5	1.79	18 53.9	1.77	22.7
24	15 17.9	15 24.6	56 2.1	1.96	56 26.6	2.11	19 37.6	1.88	23.7
25	15 31.7	15 39.1	56 52.6	2.23	57 20.0	2.32	20 24.4	2.04	24.7
26	15 46.8	15 54.5	57 48.1	2.36	58 16.3	2.35	21 15.6	2.25	25.7
27	16 2.0	16 9.3	58 44.2	2.28	59 10.9	2.16	22 12.2	2.47	26.7
28	16 16.1	16 22.3	59 35.9	1.99	59 58.6	1.77	23 13.9	2.65	27.7
29	16 27.6	16 32.0	60 18.2	1.49	60 34.2	1.17	<sup>d</sup> 0		28.7
30	16 35.3	16 37.3	60 46.2	0.82	60 53.8	+0.45	0 18.8	2.73	0.2
31	16 38.2	16 37.8	60 57.0	+0.07	60 55.7	-0.29	1 24.0	2.68	1.2
32	16 36.3	16 33.7	60 50.1	-0.64	60 40.5	-0.95	2 26.5	2.50	2.2

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SUNDAY 1.					TUESDAY 3.				
0	<sup>h</sup> 17 <sup>m</sup> 13 <sup>s</sup> 0.31	2.6071	S. 24° 28' 0.3"	6.101	0	<sup>h</sup> 19 <sup>m</sup> 21 <sup>s</sup> 56.35	2.6996	S. 25° 53' 22.8"	2.734
1	17 15 36.90	2.6125	24 34 1.5	5.938	1	19 24 38.25	2.6971	25 50 33.1	2.922
2	17 18 13.82	2.6182	24 39 52.9	5.773	2	19 27 20.00	2.6946	25 47 32.2	3.108
3	17 20 51.08	2.6237	24 45 34.3	5.605	3	19 30 1.60	2.6920	25 44 20.2	3.293
4	17 23 28.65	2.6297	24 51 5.6	5.435	4	19 32 43.03	2.6890	25 40 57.1	3.477
5	17 26 6.53	2.6339	24 56 26.6	5.263	5	19 35 24.28	2.6860	25 37 23.0	3.660
6	17 28 44.72	2.6389	25 1 37.2	5.091	6	19 38 5.35	2.6829	25 33 37.9	3.844
7	17 31 23.20	2.6438	25 6 37.5	4.918	7	19 40 46.22	2.6794	25 29 41.8	4.027
8	17 34 1.97	2.6486	25 11 27.4	4.744	8	19 43 26.88	2.6760	25 25 34.7	4.209
9	17 36 41.02	2.6531	25 16 6.8	4.569	9	19 46 7.34	2.6725	25 21 16.7	4.390
10	17 39 20.34	2.6577	25 20 35.7	4.393	10	19 48 47.57	2.6686	25 16 47.9	4.569
11	17 41 59.92	2.6618	25 24 54.0	4.216	11	19 51 27.57	2.6646	25 12 8.4	4.747
12	17 44 39.76	2.6660	25 29 1.6	4.037	12	19 54 7.33	2.6605	25 7 18.3	4.924
13	17 47 19.84	2.6700	25 32 58.5	3.858	13	19 56 46.84	2.6563	25 2 17.6	5.100
14	17 50 0.15	2.6738	25 36 44.6	3.677	14	19 59 26.09	2.6519	24 57 6.3	5.277
15	17 52 40.69	2.6774	25 40 19.8	3.496	15	20 2 5.07	2.6477	24 51 44.4	5.452
16	17 55 21.44	2.6808	25 43 44.1	3.313	16	20 43.73	2.6429	24 46 12.1	5.625
17	17 58 2.39	2.6842	25 46 57.4	3.130	17	20 7 22.21	2.6389	24 40 29.4	5.798
18	18 0 43.55	2.6875	25 49 59.7	2.945	18	20 10 0.36	2.6334	24 34 36.4	5.968
19	18 3 24.89	2.6904	25 52 50.9	2.760	19	20 12 38.22	2.6284	24 28 33.2	6.138
20	18 6 6.40	2.6933	25 55 31.0	2.575	20	20 15 15.77	2.6233	24 22 19.9	6.305
21	18 8 48.08	2.6969	25 58 0.0	2.390	21	20 17 53.00	2.6179	24 15 56.6	6.471
22	18 11 29.91	2.6994	26 0 17.8	2.202	22	20 20 29.92	2.6127	24 9 23.4	6.636
23	18 14 11.88	2.7007	S. 26° 2' 24.3"	2.014	23	20 23 6.53	2.6075	S. 24° 2' 40.3"	6.800
MONDAY 2.					WEDNESDAY 4.				
0	18 16 53.99	2.7029	S. 26° 4' 19.5"	1.826	0	20 25 42.81	2.6019	S. 23° 55' 47.4"	6.963
1	18 19 36.23	2.7048	26 6 3.4	1.637	1	20 28 18.76	2.5983	23 48 44.8	7.124
2	18 22 18.57	2.7065	26 7 36.0	1.449	2	20 30 54.36	2.5950	23 41 32.5	7.285
3	18 25 1.01	2.7081	26 8 57.3	1.260	3	20 33 29.62	2.5917	23 34 10.6	7.444
4	18 27 43.54	2.7097	26 10 7.2	1.070	4	20 36 4.53	2.5788	23 26 39.3	7.600
5	18 30 26.15	2.7108	26 11 5.7	0.880	5	20 38 39.08	2.5739	23 18 58.7	7.755
6	18 33 8.84	2.7119	26 11 52.8	0.689	6	20 41 13.27	2.5689	23 11 8.8	7.909
7	18 35 51.58	2.7127	26 12 28.4	0.497	7	20 43 47.10	2.5607	23 3 9.7	8.061
8	18 38 34.37	2.7135	26 12 52.5	0.307	8	20 46 20.56	2.5546	22 55 1.5	8.213
9	18 41 17.20	2.7140	26 13 5.2	-0.116	9	20 48 53.65	2.5484	22 46 44.3	8.361
10	18 44 0.05	2.7142	26 13 6.4	+0.075	10	20 51 26.36	2.5420	22 38 18.2	8.500
11	18 46 42.91	2.7145	26 12 56.2	0.966	11	20 53 58.69	2.5357	22 29 43.3	8.654
12	18 49 25.79	2.7145	26 12 34.5	0.458	12	20 56 30.65	2.5294	22 20 59.8	8.798
13	18 52 8.66	2.7141	26 12 1.3	0.649	13	20 59 2.22	2.5229	22 12 7.6	8.941
14	18 54 51.49	2.7136	26 11 16.6	0.840	14	21 1 33.40	2.5163	22 3 6.9	9.082
15	18 57 34.29	2.7130	26 10 20.5	1.030	15	21 4 4.18	2.5096	21 53 57.8	9.221
16	19 0 17.05	2.7122	26 9 13.0	1.221	16	21 6 34.56	2.5031	21 44 40.4	9.359
17	19 2 59.76	2.7112	26 7 54.0	1.412	17	21 9 4.55	2.4965	21 35 14.8	9.495
18	19 5 42.40	2.7100	26 6 23.6	1.602	18	21 11 34.14	2.4899	21 25 41.1	9.629
19	19 8 24.97	2.7087	26 4 41.8	1.792	19	21 14 3.34	2.4832	21 15 59.4	9.761
20	19 11 7.45	2.7073	26 2 48.6	1.981	20	21 16 32.13	2.4763	21 6 9.8	9.892
21	19 13 49.85	2.7058	26 0 44.1	2.169	21	21 19 0.50	2.4695	20 56 12.4	10.021
22	19 16 32.14	2.7038	25 58 28.3	2.358	22	21 21 28.47	2.4628	20 46 7.3	10.149
23	19 19 14.31	2.7017	25 56 1.2	2.546	23	21 23 56.04	2.4562	20 35 54.6	10.275
24	19 21 56.35	2.6996	S. 25° 53' 22.8"	2.734	24	21 26 23.21	2.4495	S. 20° 25' 34.4"	10.390

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
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## THURSDAY 5.

0	21 <sup>h</sup> 26 <sup>m</sup> 23.21	2.4495	S. 20° 25' 34.4"	10.399
1	21 28 49.97	2.4425	20 15 6.8	10.590
2	21 31 16.31	2.4355	20 4 32.0	10.640
3	21 33 42.24	2.4287	19 53 50.0	10.759
4	21 36 7.76	2.4220	19 43 0.9	10.877
5	21 38 32.87	2.4152	19 32 4.8	10.992
6	21 40 57.58	2.4084	19 21 1.9	11.104
7	21 43 21.88	2.4016	19 9 52.3	11.215
8	21 45 45.77	2.3947	18 58 36.1	11.324
9	21 48 9.24	2.3878	18 47 13.4	11.432
10	21 50 32.31	2.3812	18 35 44.3	11.539
11	21 52 54.98	2.3745	18 24 8.8	11.645
12	21 55 17.24	2.3677	18 12 27.0	11.748
13	21 57 39.10	2.3610	18 0 39.1	11.848
14	22 0 0.56	2.3542	17 48 45.2	11.948
15	22 2 21.61	2.3475	17 36 45.4	12.045
16	22 4 42.26	2.3409	17 24 39.8	12.141
17	22 7 2.52	2.3345	17 12 28.5	12.235
18	22 9 22.40	2.3280	17 0 11.6	12.328
19	22 11 41.88	2.3214	16 47 49.2	12.418
20	22 14 0.96	2.3147	16 35 21.4	12.508
21	22 16 19.65	2.3083	16 22 48.3	12.595
22	22 18 37.96	2.3020	16 10 10.0	12.681
23	22 20 55.89	2.2956	S. 15° 57' 26.6"	12.764

## SATURDAY 7.

0	23 <sup>h</sup> 16 <sup>m</sup> 29.09	2.1555	S. 10° 16' 38.2"	14.336
1	23 18 38.28	2.1508	10 2 16.7	14.379
2	23 20 47.19	2.1462	9 47 52.7	14.420
3	23 22 55.82	2.1415	9 33 26.3	14.459
4	23 25 4.18	2.1371	9 18 57.6	14.498
5	23 27 12.28	2.1328	9 4 26.6	14.535
6	23 29 20.11	2.1284	8 49 53.4	14.570
7	23 31 27.69	2.1243	8 35 18.1	14.604
8	23 33 35.02	2.1200	8 20 40.9	14.636
9	23 35 42.09	2.1158	8 6 1.8	14.668
10	23 37 48.92	2.1119	7 51 20.8	14.698
11	23 39 55.52	2.1082	7 36 38.0	14.728
12	23 42 1.90	2.1044	7 21 53.5	14.755
13	23 44 8.05	2.1006	7 7 7.4	14.781
14	23 46 13.97	2.0969	6 52 19.8	14.805
15	23 48 19.67	2.0932	6 37 30.8	14.829
16	23 50 25.15	2.0895	6 22 40.4	14.851
17	23 52 30.42	2.0860	6 7 48.7	14.872
18	23 54 35.48	2.0826	5 52 55.8	14.890
19	23 56 40.35	2.0796	5 38 1.9	14.907
20	23 58 45.03	2.0765	5 23 7.0	14.924
21	0 0 49.53	2.0735	5 8 11.1	14.940
22	0 2 53.84	2.0704	4 53 14.3	14.954
23	0 4 57.97	2.0674	S. 4° 38' 16.7"	14.968

## FRIDAY 6.

0	22 23 13.43	2.2891	S. 15° 44' 38.3"	12.846
1	22 25 30.59	2.2829	15 31 45.1	12.927
2	22 27 47.38	2.2767	15 18 47.1	13.006
3	22 30 3.80	2.2706	15 5 44.4	13.084
4	22 32 19.85	2.2644	14 52 37.1	13.160
5	22 34 35.53	2.2583	14 39 25.3	13.233
6	22 36 50.85	2.2523	14 26 9.2	13.304
7	22 39 5.81	2.2464	14 12 48.8	13.375
8	22 41 20.42	2.2405	13 59 24.2	13.444
9	22 43 34.67	2.2346	13 45 55.5	13.512
10	22 45 48.58	2.2290	13 32 22.8	13.578
11	22 48 2.15	2.2233	13 18 46.2	13.642
12	22 50 15.37	2.2176	13 5 5.8	13.705
13	22 52 28.26	2.2120	12 51 21.6	13.767
14	22 54 40.82	2.2066	12 37 33.8	13.826
15	22 56 53.05	2.2012	12 23 42.5	13.884
16	22 59 4.96	2.1959	12 9 47.8	13.940
17	23 1 16.55	2.1905	11 55 49.7	13.994
18	23 3 27.82	2.1852	11 41 48.5	14.046
19	23 5 38.78	2.1802	11 27 44.2	14.098
20	23 7 49.44	2.1752	11 13 36.8	14.148
21	23 9 59.80	2.1702	10 59 26.4	14.198
22	23 12 9.86	2.1652	10 45 13.1	14.245
23	23 14 19.62	2.1602	10 30 57.0	14.291
24	23 16 29.09	2.1555	S. 10° 16' 38.2"	14.336

## SUNDAY 8.

0	0 7 1.92	2.0645	S. 4° 23' 18.4"	14.977
1	0 9 5.71	2.0618	4 8 19.5	14.987
2	0 11 9.34	2.0590	3 53 20.0	14.997
3	0 13 12.80	2.0564	3 38 19.9	15.006
4	0 15 16.11	2.0539	3 23 19.3	15.014
5	0 17 19.27	2.0515	3 8 18.3	15.020
6	0 19 22.29	2.0492	2 53 17.0	15.023
7	0 21 25.17	2.0470	2 38 15.6	15.024
8	0 23 27.92	2.0447	2 23 14.1	15.025
9	0 25 30.53	2.0425	2 8 12.6	15.025
10	0 27 33.02	2.0405	1 53 11.1	15.024
11	0 29 35.39	2.0385	1 38 9.7	15.021
12	0 31 37.64	2.0366	1 23 8.5	15.018
13	0 33 39.78	2.0348	1 8 7.5	15.014
14	0 35 41.82	2.0332	0 53 6.8	15.009
15	0 37 43.76	2.0315	0 38 6.4	15.003
16	0 39 45.60	2.0299	0 23 6.4	14.996
17	0 41 47.35	2.0285	S. 0° 8' 6.9"	14.987
18	0 43 49.02	2.0272	N. 0° 6' 52.0"	14.977
19	0 45 50.61	2.0258	0 21 50.3	14.966
20	0 47 52.12	2.0246	0 36 47.9	14.952
21	0 49 53.56	2.0236	0 51 44.6	14.937
22	0 51 54.94	2.0225	1 6 40.4	14.922
23	0 53 56.26	2.0214	1 21 35.3	14.906
24	0 55 57.51	2.0204	N. 1° 36' 29.2"	14.890

## GREENWICH MEAN TIME

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
MONDAY 9.					WEDNESDAY 11.				
0	0 55 57.51	2.0204	N. 1° 36' 29.2"	14.890	0	2 33 15.32	2.0581	N. 12° 50' 55.2"	12.808
1	0 57 58.71	2.0197	1 51 22.1	14.873	1	2 35 18.87	2.0602	13 3 41.4	12.735
2	0 59 59.87	2.0191	2 6 14.0	14.855	2	2 37 22.55	2.0625	13 16 23.4	12.665
3	1 2 1.00	2.0184	2 21 4.7	14.834	3	2 39 26.37	2.0648	13 29 1.2	12.594
4	1 4 2.08	2.0177	2 35 54.1	14.811	4	2 41 30.33	2.0672	13 41 34.7	12.522
5	1 6 3.12	2.0172	2 50 42.1	14.788	5	2 43 34.43	2.0695	13 54 3.9	12.450
6	1 8 4.14	2.0168	3 5 28.7	14.764	6	2 45 38.67	2.0719	14 6 28.7	12.375
7	1 10 5.13	2.0163	3 20 13.8	14.739	7	2 47 43.05	2.0743	14 18 48.9	12.299
8	1 12 6.10	2.0161	3 34 57.4	14.713	8	2 49 47.58	2.0768	14 31 4.6	12.223
9	1 14 7.06	2.0159	3 49 39.4	14.686	9	2 51 52.27	2.0794	14 43 15.7	12.146
10	1 16 8.01	2.0158	4 4 19.8	14.659	10	2 53 57.11	2.0820	14 55 22.2	12.068
11	1 18 8.95	2.0156	4 18 58.5	14.630	11	2 56 2.10	2.0844	15 7 24.0	11.990
12	1 20 9.88	2.0155	4 33 35.4	14.600	12	2 58 7.24	2.0870	15 19 21.0	11.910
13	1 22 10.81	2.0156	4 48 10.5	14.569	13	3 0 12.54	2.0896	15 31 13.2	11.830
14	1 24 11.75	2.0158	5 2 43.7	14.536	14	3 2 18.00	2.0924	15 43 0.6	11.748
15	1 26 12.70	2.0159	5 17 14.9	14.503	15	3 4 23.63	2.0952	15 54 43.0	11.665
16	1 28 13.66	2.0162	5 31 44.1	14.469	16	3 6 29.42	2.0979	16 6 20.4	11.580
17	1 30 14.64	2.0165	5 46 11.2	14.433	17	3 8 35.37	2.1006	16 17 52.7	11.495
18	1 32 15.64	2.0170	6 0 36.1	14.396	18	3 10 41.49	2.1034	16 29 19.9	11.410
19	1 34 16.67	2.0174	6 14 58.7	14.357	19	3 12 47.78	2.1062	16 40 31.9	11.323
20	1 36 17.73	2.0179	6 29 19.0	14.318	20	3 14 54.23	2.1089	16 51 48.7	11.236
21	1 38 18.82	2.0185	6 43 36.9	14.277	21	3 17 0.85	2.1117	17 3 0.2	11.147
22	1 40 19.95	2.0193	6 57 52.3	14.236	22	3 19 7.64	2.1146	17 14 6.3	11.057
23	1 42 21.13	2.0201	N. 7 12 5.2	14.193	23	3 21 14.61	2.1176	N. 17 25 7.0	10.967
TUESDAY 10.					THURSDAY 12.				
0	1 44 22.36	2.0209	N. 7 26 15.5	14.150	0	3 23 21.75	2.1204	N. 17 36 12.3	10.876
1	1 46 23.64	2.0218	7 40 23.2	14.106	1	3 25 29.06	2.1234	17 47 2.1	10.794
2	1 48 24.97	2.0226	7 54 28.3	14.062	2	3 27 36.55	2.1262	17 57 46.4	10.690
3	1 50 26.35	2.0237	8 8 30.7	14.018	3	3 29 44.21	2.1291	18 8 25.0	10.595
4	1 52 27.80	2.0248	8 22 30.3	13.969	4	3 31 52.04	2.1321	18 18 57.9	10.500
5	1 54 29.32	2.0259	8 36 27.0	13.920	5	3 34 0.05	2.1350	18 29 25.1	10.405
6	1 56 30.91	2.0271	8 50 20.7	13.870	6	3 36 8.25	2.1381	18 39 46.5	10.307
7	1 58 32.57	2.0283	9 4 11.4	13.820	7	3 38 16.63	2.1411	18 50 2.0	10.209
8	2 0 34.31	2.0297	9 17 59.1	13.769	8	3 40 25.18	2.1439	19 0 11.6	10.110
9	2 2 36.13	2.0310	9 31 43.7	13.716	9	3 42 33.89	2.1467	19 10 15.2	10.010
10	2 4 38.03	2.0325	9 45 25.1	13.663	10	3 44 42.78	2.1498	19 20 12.8	9.910
11	2 6 40.02	2.0339	9 59 3.3	13.608	11	3 46 51.86	2.1529	19 30 4.4	9.809
12	2 8 42.10	2.0354	10 12 38.2	13.552	12	3 49 1.13	2.1559	19 39 49.9	9.708
13	2 10 44.27	2.0370	10 26 9.7	13.496	13	3 51 10.57	2.1588	19 49 29.3	9.605
14	2 12 46.54	2.0387	10 39 37.8	13.439	14	3 53 20.19	2.1617	19 59 2.5	9.500
15	2 14 48.92	2.0405	10 53 2.4	13.379	15	3 55 29.98	2.1645	20 8 29.3	9.395
16	2 16 51.40	2.0422	11 6 23.3	13.318	16	3 57 39.94	2.1676	20 17 49.8	9.288
17	2 18 53.98	2.0439	11 19 40.6	13.257	17	3 59 50.09	2.1707	20 27 3.9	9.181
18	2 20 56.67	2.0458	11 32 54.2	13.196	18	4 2 0.42	2.1737	20 36 11.6	9.074
19	2 22 59.47	2.0477	11 46 4.1	13.133	19	4 4 10.92	2.1764	20 45 12.8	8.966
20	2 25 2.39	2.0498	11 59 10.2	13.069	20	4 6 21.59	2.1793	20 54 7.5	8.857
21	2 27 5.44	2.0518	12 12 12.4	13.004	21	4 8 32.44	2.1823	21 2 55.6	8.747
22	2 29 8.61	2.0538	12 25 10.7	12.938	22	4 10 43.46	2.1850	21 11 37.1	8.636
23	2 31 11.90	2.0559	12 38 5.0	12.871	23	4 12 54.65	2.1878	21 20 11.9	8.524
24	2 33 15.32	2.0581	N. 12 50 55.2	12.809	24	4 15 6.00	2.1906	N. 21 28 40.0	8.412

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
FRIDAY 13.					SUNDAY 15.				
0	<sup>h</sup> 4 <sup>m</sup> 15 <sup>s</sup> 6.00	2.1906	N.21° 28' 40.0"	8.412	0	<sup>h</sup> 6 <sup>m</sup> 2 <sup>s</sup> 43.95	2.2718	N.25° 51' 17.8"	2.254
1	4 17 17.52	2.1934	21 37 1.4	8.301	1	6 5 0.26	2.2720	25 53 35.0	2.219
2	4 19 29.21	2.1964	21 45 16.1	8.187	2	6 7 16.58	2.2721	25 55 44.1	2.085
3	4 21 41.08	2.1993	21 53 23.9	8.072	3	6 9 32.90	2.2720	25 57 45.2	1.950
4	4 23 53.11	2.2018	22 1 24.8	7.956	4	6 11 49.21	2.2717	25 59 38.2	1.816
5	4 26 5.30	2.2044	22 9 18.7	7.840	5	6 14 5.50	2.2714	26 1 23.2	1.683
6	4 28 17.64	2.2071	22 17 5.6	7.723	6	6 16 21.77	2.2710	26 3 0.2	1.549
7	4 30 30.14	2.2096	22 24 45.5	7.606	7	6 18 38.02	2.2706	26 4 29.1	1.414
8	4 32 42.80	2.2123	22 32 18.4	7.489	8	6 20 54.24	2.2702	26 5 49.9	1.280
9	4 34 55.62	2.2149	22 39 44.2	7.370	9	6 23 10.44	2.2697	26 7 2.7	1.146
10	4 37 8.59	2.2174	22 47 2.8	7.250	10	6 25 26.60	2.2689	26 8 7.5	1.012
11	4 39 21.71	2.2199	22 54 14.2	7.130	11	6 27 42.71	2.2682	26 9 4.2	0.878
12	4 41 34.97	2.2223	23 1 18.4	7.010	12	6 29 58.78	2.2674	26 9 52.9	0.745
13	4 43 48.38	2.2247	23 8 15.4	6.889	13	6 32 14.79	2.2664	26 10 33.6	0.610
14	4 46 1.93	2.2271	23 15 5.1	6.766	14	6 34 30.75	2.2655	26 11 6.2	0.476
15	4 48 15.63	2.2294	23 21 47.4	6.643	15	6 36 46.66	2.2645	26 11 30.8	0.343
16	4 50 29.46	2.2316	23 28 22.3	6.520	16	6 39 2.50	2.2633	26 11 47.4	0.210
17	4 52 43.42	2.2338	23 34 49.8	6.396	17	6 41 18.26	2.2620	26 11 56.0	+0.076
18	4 54 57.52	2.2360	23 41 9.9	6.273	18	6 43 33.94	2.2606	26 11 56.6	-0.057
19	4 57 11.75	2.2381	23 47 22.5	6.147	19	6 45 49.54	2.2593	26 11 49.2	0.189
20	4 59 26.10	2.2402	23 53 27.6	6.022	20	6 48 5.06	2.2579	26 11 33.9	0.321
21	5 1 40.57	2.2423	23 59 25.2	5.896	21	6 50 20.49	2.2563	26 11 10.7	0.453
22	5 3 55.16	2.2442	24 5 15.2	5.770	22	6 52 35.82	2.2547	26 10 39.6	0.583
23	5 6 9.87	2.2461	N.24 10 57.6	5.643	23	6 54 51.05	2.2530	N.26 10 0.7	0.714
SATURDAY 14.					MONDAY 16.				
0	5 8 24.69	2.2479	N.24 16 32.4	5.516	0	6 57 6.18	2.2512	N.26 9 13.9	0.846
1	5 10 39.62	2.2497	24 21 59.4	5.386	1	6 59 21.20	2.2494	26 8 19.2	0.977
2	5 12 54.65	2.2514	24 27 18.7	5.258	2	7 1 36.10	2.2474	26 7 16.7	1.107
3	5 15 9.79	2.2532	24 32 30.4	5.131	3	7 3 50.88	2.2454	26 6 6.4	1.237
4	5 17 25.03	2.2547	24 37 34.4	5.002	4	7 6 5.54	2.2433	26 4 48.3	1.367
5	5 19 40.36	2.2562	24 42 30.6	4.873	5	7 8 20.07	2.2411	26 3 22.4	1.497
6	5 21 55.77	2.2576	24 47 19.0	4.742	6	7 10 34.47	2.2388	26 1 48.7	1.627
7	5 24 11.27	2.2590	24 51 59.6	4.612	7	7 12 48.73	2.2365	26 0 7.2	1.756
8	5 26 26.86	2.2605	24 56 32.4	4.482	8	7 15 2.85	2.2342	25 58 18.0	1.884
9	5 28 42.53	2.2617	25 0 57.4	4.351	9	7 17 16.84	2.2317	25 56 21.2	2.010
10	5 30 58.27	2.2629	25 5 14.5	4.219	10	7 19 30.69	2.2292	25 54 16.8	2.137
11	5 33 14.08	2.2640	25 9 23.7	4.087	11	7 21 44.38	2.2267	25 52 4.8	2.264
12	5 35 29.95	2.2651	25 13 25.0	3.956	12	7 23 57.90	2.2242	25 49 45.2	2.390
13	5 37 45.89	2.2661	25 17 18.4	3.823	13	7 26 11.27	2.2215	25 47 18.0	2.515
14	5 40 1.88	2.2670	25 21 3.8	3.690	14	7 28 24.48	2.2189	25 44 43.3	2.641
15	5 42 17.93	2.2679	25 24 41.2	3.556	15	7 30 37.54	2.2162	25 42 1.1	2.765
16	5 44 34.03	2.2687	25 28 10.6	3.423	16	7 32 50.43	2.2133	25 39 11.5	2.889
17	5 46 50.17	2.2693	25 31 32.0	3.291	17	7 35 3.14	2.2102	25 36 14.5	3.012
18	5 49 6.34	2.2699	25 34 45.5	3.158	18	7 37 15.66	2.2072	25 33 10.1	3.135
19	5 51 22.55	2.2704	25 37 51.0	3.024	19	7 39 28.00	2.2042	25 29 58.3	3.259
20	5 53 38.79	2.2709	25 40 48.4	2.890	20	7 41 40.17	2.2013	25 26 39.1	3.380
21	5 55 55.06	2.2714	25 43 37.8	2.756	21	7 43 52.16	2.1982	25 23 12.7	3.501
22	5 58 11.35	2.2716	25 46 19.2	2.622	22	7 46 3.95	2.1949	25 19 39.0	3.622
23	6 0 27.65	2.2717	25 48 52.5	2.488	23	7 48 15.54	2.1915	25 15 58.1	3.743
24	6 2 43.95	2.2718	N.25 51 17.8	2.354	24	7 50 26.94	2.1883	N.25 12 10.0	3.861



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
TUESDAY 17.					THURSDAY 19.				
0	7 50 26.94	2.1883	N.25° 12' 10.0"	3.861	0	9 31 6.46	2.0010	N.20° 2' 29.9"	8.755
1	7 52 38.14	2.1849	25 8 14.9	3.979	1	9 33 6.40	1.9971	19 53 42.1	8.838
2	7 54 49.13	2.1816	25 4 12.7	4.096	2	9 35 6.11	1.9933	19 44 49.4	8.930
3	7 56 59.93	2.1783	25 0 3.4	4.215	3	9 37 5.59	1.9894	19 35 51.8	9.001
4	7 59 10.52	2.1747	24 55 46.9	4.334	4	9 39 4.84	1.9855	19 26 49.3	9.082
5	8 1 20.89	2.1711	24 51 23.4	4.450	5	9 41 3.86	1.9817	19 17 42.0	9.162
6	8 3 31.05	2.1676	24 46 52.9	4.566	6	9 43 2.64	1.9777	19 8 29.9	9.241
7	8 5 41.00	2.1639	24 42 15.5	4.681	7	9 45 1.19	1.9741	18 59 13.1	9.319
8	8 7 50.73	2.1603	24 37 31.2	4.795	8	9 46 59.52	1.9704	18 49 51.6	9.398
9	8 10 0.24	2.1570	24 32 40.1	4.909	9	9 48 57.64	1.9668	18 40 25.4	9.475
10	8 12 9.53	2.1530	24 27 42.2	5.021	10	9 50 55.53	1.9630	18 30 54.6	9.550
11	8 14 18.60	2.1493	24 22 37.6	5.133	11	9 52 53.20	1.9592	18 21 19.3	9.625
12	8 16 27.44	2.1454	24 17 26.3	5.244	12	9 54 50.64	1.9556	18 11 39.5	9.700
13	8 18 36.05	2.1415	24 12 8.3	5.355	13	9 56 47.87	1.9521	18 1 55.2	9.775
14	8 20 44.43	2.1378	24 6 43.7	5.465	14	9 58 44.89	1.9487	17 52 6.5	9.849
15	8 22 52.59	2.1340	24 1 12.5	5.574	15	10 0 41.70	1.9451	17 42 13.4	9.922
16	8 25 0.51	2.1300	23 55 34.9	5.682	16	10 2 38.30	1.9415	17 32 15.9	9.994
17	8 27 8.19	2.1261	23 49 50.7	5.790	17	10 4 34.69	1.9380	17 22 14.1	10.066
18	8 29 15.64	2.1223	23 44 0.1	5.897	18	10 6 30.87	1.9346	17 12 8.0	10.137
19	8 31 22.86	2.1184	23 38 3.1	6.004	19	10 8 26.85	1.9313	17 1 57.7	10.206
20	8 33 29.84	2.1142	23 31 59.7	6.110	20	10 10 22.63	1.9280	16 51 43.3	10.274
21	8 35 36.57	2.1101	23 25 50.6	6.216	21	10 12 18.21	1.9247	16 41 24.8	10.343
22	8 37 43.06	2.1062	23 19 34.0	6.320	22	10 14 13.59	1.9214	16 31 2.2	10.410
23	8 39 49.32	2.1023	N.23° 13' 11.8"	6.423	23	10 16 8.78	1.9184	N.16° 20' 35.6"	10.477
WEDNESDAY 18.					FRIDAY 20.				
0	8 41 55.34	2.0984	N.23° 6' 43.4"	6.524	0	10 18 3.79	1.9153	N.16° 10' 5.0"	10.543
1	8 44 1.12	2.0943	23 0 8.9	6.636	1	10 19 58.61	1.9120	15 59 30.4	10.610
2	8 46 6.65	2.0901	22 53 28.3	6.737	2	10 21 53.24	1.9089	15 48 51.8	10.675
3	8 48 11.93	2.0859	22 46 41.7	6.837	3	10 23 47.68	1.9058	15 38 9.4	10.739
4	8 50 16.96	2.0819	22 39 49.1	6.927	4	10 25 41.94	1.9029	15 27 23.2	10.801
5	8 52 21.75	2.0779	22 32 50.5	7.026	5	10 27 36.03	1.9001	15 16 33.3	10.863
6	8 54 26.31	2.0740	22 25 46.0	7.124	6	10 29 29.95	1.8973	15 5 39.7	10.924
7	8 56 30.62	2.0698	22 18 35.7	7.220	7	10 31 23.70	1.8944	14 54 42.4	10.986
8	8 58 34.68	2.0656	22 11 19.6	7.317	8	10 33 17.28	1.8915	14 43 41.4	11.047
9	9 0 38.49	2.0615	22 3 57.7	7.413	9	10 35 10.68	1.8887	14 32 36.8	11.107
10	9 2 42.06	2.0575	21 56 30.1	7.508	10	10 37 3.92	1.8860	14 21 28.6	11.166
11	9 4 45.38	2.0533	21 48 56.8	7.602	11	10 38 57.01	1.8836	14 10 16.9	11.224
12	9 6 48.46	2.0494	21 41 17.9	7.694	12	10 40 49.95	1.8811	13 59 1.7	11.283
13	9 8 51.30	2.0453	21 33 33.5	7.786	13	10 42 42.74	1.8785	13 47 43.0	11.341
14	9 10 53.89	2.0411	21 25 43.6	7.878	14	10 44 35.37	1.8758	13 36 20.8	11.398
15	9 12 56.23	2.0370	21 17 48.2	7.969	15	10 46 27.84	1.8734	13 24 53.3	11.453
16	9 14 58.33	2.0330	21 9 47.3	8.060	16	10 48 20.17	1.8711	13 13 26.5	11.508
17	9 17 0.19	2.0290	21 1 41.0	8.150	17	10 50 12.37	1.8689	13 1 54.4	11.562
18	9 19 1.81	2.0250	20 53 29.3	8.239	18	10 52 4.43	1.8665	12 50 19.1	11.615
19	9 21 3.19	2.0209	20 45 12.3	8.327	19	10 53 56.35	1.8643	12 38 40.6	11.669
20	9 23 4.32	2.0169	20 36 50.1	8.414	20	10 55 48.15	1.8622	12 26 58.9	11.722
21	9 25 5.21	2.0128	20 28 22.7	8.500	21	10 57 39.82	1.8601	12 15 14.0	11.774
22	9 27 5.86	2.0089	20 19 50.2	8.585	22	10 59 31.37	1.8582	12 3 26.0	11.825
23	9 29 6.28	2.0050	20 11 12.6	8.670	23	11 1 22.80	1.8561	11 51 35.0	11.875
24	9 31 6.46	2.0010	N.20° 2' 29.9"	8.755	24	11 3 14.10	1.8541	N.11° 39' 41.0"	11.925

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.	Hour.	Right Ascension.	Diff. for 1 m.	Declination.	Diff. for 1 m.
SATURDAY 21.					MONDAY 23.				
0	11 3 14.10	1.8541	N. 11° 39' 41.0"	11.895	0	12 31 16.04	1.8408	N. 1° 21' 50.8"	13.571
1	11 5 5.29	1.8523	11 27 44.0	11.975	1	12 33 6.53	1.8423	1 8 16.0	13.589
2	11 6 56.38	1.8507	11 15 44.0	12.094	2	12 34 57.11	1.8437	0 54 40.1	13.607
3	11 8 47.37	1.8490	11 3 41.1	12.073	3	12 36 47.77	1.8453	0 41 3.2	13.624
4	11 10 38.25	1.8472	10 51 35.3	12.190	4	12 38 38.54	1.8471	0 27 25.3	13.640
5	11 12 29.03	1.8456	10 39 26.8	12.165	5	12 40 29.42	1.8490	0 13 46.4	13.656
6	11 14 19.72	1.8441	10 27 15.5	12.211	6	12 42 20.41	1.8508	N. 0 0 6.6	13.671
7	11 16 10.32	1.8426	10 15 1.5	12.256	7	12 44 11.52	1.8526	S. 0 13 34.1	13.686
8	11 18 0.83	1.8411	10 2 44.8	12.301	8	12 46 2.75	1.8549	0 27 15.7	13.699
9	11 19 51.25	1.8396	9 50 25.4	12.345	9	12 47 54.10	1.8570	0 40 58.0	13.711
10	11 21 41.59	1.8384	9 38 3.4	12.389	10	12 49 45.58	1.8591	0 54 41.0	13.723
11	11 23 31.86	1.8373	9 25 38.8	12.432	11	12 51 37.20	1.8616	1 8 24.7	13.733
12	11 25 22.07	1.8361	9 13 11.6	12.475	12	12 53 28.97	1.8640	1 22 9.0	13.743
13	11 27 12.20	1.8350	9 0 41.8	12.518	13	12 55 20.88	1.8664	1 35 53.9	13.753
14	11 29 2.27	1.8339	8 48 9.5	12.558	14	12 57 12.94	1.8689	1 49 39.4	13.763
15	11 30 52.27	1.8329	8 35 34.9	12.597	15	12 59 5.14	1.8714	2 3 25.4	13.770
16	11 32 42.21	1.8321	8 22 57.9	12.637	16	13 0 57.51	1.8743	2 17 11.8	13.777
17	11 34 32.11	1.8313	8 10 18.5	12.676	17	13 2 50.05	1.8770	2 30 58.6	13.788
18	11 36 21.97	1.8306	7 57 36.8	12.714	18	13 4 42.75	1.8798	2 44 45.7	13.787
19	11 38 11.78	1.8298	7 44 52.8	12.753	19	13 6 35.63	1.8829	2 58 33.0	13.791
20	11 40 1.55	1.8291	7 32 6.5	12.790	20	13 8 28.69	1.8858	3 12 20.6	13.795
21	11 41 51.27	1.8285	7 19 18.0	12.827	21	13 10 21.93	1.8889	3 26 8.4	13.797
22	11 43 40.97	1.8281	7 6 27.3	12.863	22	13 12 15.36	1.8922	3 39 56.3	13.799
23	11 45 30.64	1.8277	N. 6° 53' 34.5"	12.898	23	13 14 8.99	1.8955	S. 3 53 44.3	13.800
SUNDAY 22.					TUESDAY 24.				
0	11 47 20.29	1.8273	N. 6° 40' 39.6"	12.933	0	13 16 2.82	1.8989	S. 4 7 32.3	13.800
1	11 49 9.92	1.8270	6 27 42.6	12.967	1	13 17 56.85	1.9022	4 21 20.3	13.800
2	11 50 59.53	1.8269	6 14 43.6	13.000	2	13 19 51.09	1.9058	4 35 8.3	13.799
3	11 52 49.13	1.8266	6 1 42.6	13.034	3	13 21 45.55	1.9095	4 48 56.2	13.796
4	11 54 38.72	1.8266	5 48 39.6	13.066	4	13 23 40.23	1.9131	5 2 43.9	13.794
5	11 56 28.32	1.8267	5 35 34.7	13.098	5	13 25 35.13	1.9170	5 16 31.5	13.790
6	11 58 17.92	1.8267	5 22 27.9	13.128	6	13 27 30.26	1.9209	5 30 18.8	13.785
7	12 0 7.53	1.8268	5 9 19.3	13.158	7	13 29 25.63	1.9249	5 44 5.7	13.777
8	12 1 57.14	1.8269	4 56 8.9	13.188	8	13 31 21.24	1.9289	5 57 52.1	13.769
9	12 3 46.76	1.8272	4 42 56.8	13.216	9	13 33 17.10	1.9330	6 11 38.0	13.761
10	12 5 36.40	1.8276	4 29 43.0	13.244	10	13 35 13.20	1.9371	6 25 23.4	13.752
11	12 7 26.07	1.8282	4 16 27.5	13.272	11	13 37 9.56	1.9414	6 39 8.3	13.743
12	12 9 15.78	1.8287	4 3 10.4	13.299	12	13 39 6.17	1.9458	6 52 52.6	13.733
13	12 11 5.52	1.8292	3 49 51.7	13.325	13	13 41 3.05	1.9503	7 6 36.3	13.721
14	12 12 55.29	1.8298	3 36 31.4	13.351	14	13 43 0.21	1.9549	7 20 19.2	13.708
15	12 14 45.10	1.8306	3 23 9.6	13.376	15	13 44 57.64	1.9595	7 34 1.3	13.693
16	12 16 34.96	1.8314	3 9 46.3	13.401	16	13 46 55.35	1.9642	7 47 42.4	13.677
17	12 18 24.87	1.8323	2 56 21.5	13.425	17	13 48 53.35	1.9691	8 1 22.6	13.661
18	12 20 14.83	1.8332	2 42 55.2	13.449	18	13 50 51.64	1.9740	8 15 1.8	13.644
19	12 22 4.66	1.8344	2 29 27.6	13.471	19	13 52 50.22	1.9788	8 28 30.9	13.625
20	12 23 54.95	1.8353	2 15 58.7	13.493	20	13 54 49.10	1.9839	8 42 16.8	13.605
21	12 25 45.10	1.8364	2 2 28.5	13.513	21	13 56 48.29	1.9891	8 55 52.5	13.584
22	12 27 35.22	1.8377	1 48 57.1	13.533	22	13 58 47.79	1.9944	9 9 26.9	13.562
23	12 29 25.63	1.8390	1 35 24.5	13.553	23	14 0 47.61	1.9997	9 23 0.0	13.540
24	12 31 16.04	1.8408	N. 1° 21' 50.8"	13.571	24	14 2 47.75	2.0050	S. 9 36 31.7	13.516

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.		Noon.	P. L. of Diff.	III <sup>h</sup> .	P. L. of Diff.	VI <sup>h</sup> .	P. L. of Diff.	IX <sup>h</sup> .	P. L. of Diff.
2	SUN	W.	23 15 46	2475	24 57 35	2472	26 39 28	2469	28 21 25	2467
	Fomalhaut	E.	59 32 36	2394	57 48 52	2403	56 5 21	2412	54 22 3	2422
	α Pegasi	E.	79 31 35	2585	77 52 20	2590	76 13 11	2595	74 34 9	2601
3	SUN	W.	36 51 28	2467	38 33 27	2469	40 15 24	2471	41 57 18	2474
	Fomalhaut	E.	45 50 11	2506	44 9 6	2531	42 28 36	2560	40 48 46	2594
	α Pegasi	E.	66 21 47	2657	64 44 9	2674	63 6 54	2692	61 30 4	2713
	α Arietis	E.	107 51 41	2267	106 4 53	2267	104 18 5	2267	102 31 17	2267
4	SUN	W.	50 25 40	2493	52 7 3	2498	53 48 19	2504	55 29 27	2510
	Saturn	W.	14 37 54	2346	16 22 46	2325	18 8 9	2311	19 53 52	2301
	α Pegasi	E.	53 34 2	2661	52 0 53	2690	50 28 34	2644	48 57 11	2692
	α Arietis	E.	93 37 52	2281	91 51 25	2286	90 5 5	2291	88 18 52	2297
5	SUN	W.	63 52 56	2544	65 33 8	2551	67 13 10	2559	68 53 1	2567
	Saturn	W.	28 44 21	2297	30 30 25	2300	32 16 25	2304	34 2 19	2309
	Venus	W.	28 12 29	2619	29 50 58	2696	31 29 18	2633	33 7 28	2641
	α Arietis	E.	79 30 7	2333	77 44 55	2341	75 59 55	2350	74 15 8	2359
	Aldebaran	E.	109 49 8	2252	108 1 58	2258	106 14 57	2265	104 28 6	2272
6	SUN	W.	77 9 23	2611	78 48 3	2620	80 26 31	2629	82 4 46	2639
	α Aquilæ	W.	46 10 45	4169	47 19 40	4072	48 30 9	3981	49 42 7	3903
	Saturn	W.	42 49 46	2341	44 34 46	2348	46 19 36	2355	48 4 15	2364
	Venus	W.	41 15 33	2684	42 52 35	2692	44 29 25	2701	46 6 3	2710
	α Arietis	E.	65 34 52	2414	63 51 37	2426	62 8 40	2438	60 26 0	2453
	Aldebaran	E.	95 36 37	2311	93 50 54	2320	92 5 24	2328	90 20 6	2337
7	SUN	W.	90 12 48	2687	91 49 46	2696	93 26 31	2706	95 3 3	2716
	Saturn	W.	56 44 34	2405	58 28 2	2413	60 11 18	2422	61 54 21	2431
	α Aquilæ	W.	55 59 21	3621	57 17 33	3579	58 36 30	3544	59 56 6	3513
	Venus	W.	54 6 5	2759	55 41 27	2768	57 16 37	2779	58 51 33	2788
	α Arietis	E.	51 57 45	2530	50 17 13	2547	48 37 5	2566	46 57 23	2586
	Aldebaran	E.	81 36 47	2382	79 52 46	2391	78 8 59	2401	76 25 25	2410
8	SUN	W.	103 2 25	2766	104 37 38	2775	106 12 39	2785	107 47 27	2795
	Saturn	W.	70 26 30	2475	72 8 18	2484	73 49 54	2493	75 31 17	2502
	Venus	W.	66 43 4	2637	68 16 44	2647	69 50 11	2657	71 23 25	2667
	α Aquilæ	W.	66 41 34	3402	68 3 48	3388	69 26 18	3376	70 49 2	3365
	Fomalhaut	W.	31 33 51	3084	33 2 20	3039	34 31 44	3001	36 1 56	2966
	α Arietis	E.	38 46 26	2711	37 10 1	2743	35 34 18	2779	33 59 22	2818
	Aldebaran	E.	67 50 58	2458	66 8 46	2467	64 26 47	2477	62 45 2	2487
	Pollux	E.	111 57 38	2436	110 14 55	2445	108 32 25	2455	106 50 8	2463
9	SUN	W.	115 38 16	2843	117 11 48	2852	118 45 8	2862	120 18 16	2872
	Saturn	W.	83 55 5	2546	85 35 14	2556	87 15 10	2564	88 54 54	2572
	Venus	W.	79 6 28	2915	80 38 27	2925	82 10 14	2935	83 41 49	2944
	α Aquilæ	W.	77 44 58	3340	79 8 23	3339	80 31 49	3339	81 55 15	3349
	Fomalhaut	W.	43 41 51	2660	45 15 1	2649	46 48 25	2638	48 22 3	2631
	Aldebaran	E.	54 19 47	2538	52 39 26	2548	50 59 19	2559	49 19 27	2569
	Pollux	E.	98 21 48	2509	96 40 45	2516	94 59 54	2525	93 19 15	2533
10	SUN	W.	128 0 50	2990	129 32 44	2998	131 4 27	2938	132 35 58	2947
	Saturn	W.	97 10 37	2617	98 49 9	2625	100 27 30	2634	102 5 39	2643
	Venus	W.	91 16 44	2992	92 47 7	3001	94 17 19	3010	95 47 19	3020
	α Aquilæ	W.	88 51 21	3369	90 14 13	3377	91 36 56	3387	92 59 27	3396

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.		Midnight.	P. L. of Diff.	XV <sup>h</sup> .	P. L. of Diff.	XVIII <sup>h</sup> .	P. L. of Diff.	XXI <sup>h</sup> .	P. L. of Diff.
2	SUN	W.	30 3 24	2467	31 45 24	2465	33 27 26	2466	35 9 27	2466
	Fomalhaut	E.	52 39 0	2434	50 56 14	2448	49 13 48	2465	47 31 46	2485
	α Pegasi	E.	72 55 15	2600	71 16 32	2618	69 38 1	2629	67 59 45	2642
3	SUN	W.	43 39 8	2477	45 20 54	2480	47 2 35	2485	48 44 10	2488
	Fomalhaut	E.	39 9 43	2632	37 31 32	2675	35 54 19	2725	34 18 13	2785
	α Pegasi	E.	59 53 42	2738	58 17 52	2763	56 42 36	2792	55 7 58	2825
	α Arietis	E.	100 44 29	2969	98 57 44	2971	97 11 2	2974	95 24 24	2978
4	SUN	W.	57 10 27	2516	58 51 18	2522	60 32 0	2529	62 12 33	2536
	Saturn	W.	21 39 50	2996	23 25 55	2994	25 12 4	2994	26 58 13	2994
	α Pegasi	E.	47 26 48	3045	45 57 31	3105	44 29 27	3172	43 2 44	3247
	α Arietis	E.	86 32 48	3303	84 46 53	3309	83 1 7	3316	81 15 31	3394
5	SUN	W.	70 32 41	2576	72 12 9	2584	73 51 26	2593	75 30 31	2602
	Saturn	W.	35 48 5	2314	37 33 44	2320	39 19 14	2327	41 4 34	2333
	Venus	W.	34 45 27	2649	36 23 16	2657	38 0 53	2666	39 38 19	2675
	α Arietis	E.	72 30 35	2369	70 46 16	2380	69 2 12	2391	67 18 24	2402
	Aldebaran	E.	102 41 26	2979	100 54 56	2987	99 8 38	2996	97 22 32	3003
6	SUN	W.	83 42 48	2649	85 20 37	2657	86 58 14	2666	88 35 37	2677
	α Aquilæ	W.	50 55 24	3614	52 9 51	3771	53 25 23	3714	54 41 55	3663
	Saturn	W.	49 48 42	2371	51 32 58	2380	53 17 2	2388	55 0 54	2396
	Venus	W.	47 42 29	2730	49 18 42	2730	50 54 42	2739	52 30 30	2749
	α Arietis	E.	58 43 40	2467	57 1 40	2481	55 20 0	2496	53 38 41	2512
	Aldebaran	E.	88 35 1	2346	86 50 8	2355	85 5 28	2364	83 21 1	2373
7	SUN	W.	96 39 21	2725	98 15 27	2736	99 51 19	2746	101 26 58	2755
	Saturn	W.	63 37 12	2440	65 19 50	2448	67 2 16	2458	68 44 29	2466
	α Aquilæ	W.	61 16 16	3485	62 36 57	3461	63 58 5	3438	65 19 39	3419
	Venus	W.	60 26 17	2798	62 0 48	2806	63 35 6	2818	65 9 11	2827
	α Arietis	E.	45 18 9	2607	43 39 24	2631	42 1 11	2655	40 23 31	2681
	Aldebaran	E.	74 42 5	2419	72 58 58	2429	71 16 4	2438	69 33 24	2446
8	SUN	W.	109 22 2	2805	110 56 24	2814	112 30 34	2824	114 4 31	2833
	Saturn	W.	77 12 27	2511	78 53 25	2520	80 34 11	2529	82 14 44	2538
	Venus	W.	72 56 26	2876	74 29 15	2886	76 1 52	2896	77 34 16	2906
	α Aquilæ	W.	72 11 58	3358	73 35 3	3351	74 58 16	3345	76 21 35	3342
	Fomalhaut	W.	37 32 51	2936	39 4 24	2912	40 36 28	2891	42 8 58	2873
	α Arietis	E.	32 25 18	2983	30 52 12	2913	29 20 10	2971	27 49 21	3035
	Aldebaran	E.	61 3 31	2497	59 22 14	2507	57 41 11	2517	56 0 22	2527
	Pollux	E.	105 8 3	2472	103 26 11	2481	101 44 31	2489	100 3 3	2499
9	SUN	W.	121 51 11	2881	123 23 54	2891	124 56 25	2900	126 28 44	2910
	Saturn	W.	90 34 27	2582	92 13 47	2590	93 52 56	2599	95 31 52	2607
	Venus	W.	85 13 12	2954	86 44 23	2963	88 15 22	2973	89 46 9	2982
	α Aquilæ	W.	83 18 38	3345	84 41 58	3350	86 5 12	3355	87 28 20	3361
	Fomalhaut	W.	49 55 50	2896	51 29 44	2822	53 3 43	2818	54 37 48	2816
	Aldebaran	E.	47 39 50	2560	46 0 28	2591	44 21 21	2603	42 42 30	2615
	Pollux	E.	91 38 48	2542	89 58 33	2551	88 18 30	2559	86 38 39	2568
10	SUN	W.	134 7 17	2957	135 38 24	2966	137 9 19	2975	138 40 3	2985
	Saturn	W.	103 43 36	2652	105 21 21	2660	106 58 55	2669	108 36 16	2678
	Venus	W.	97 17 7	2989	98 46 44	2999	100 16 9	3047	101 45 23	3057
	α Aquilæ	W.	94 21 46	3410	95 43 51	3423	97 5 42	3438	98 27 16	3453

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
10	Fomalhaut W.	56 11 55	2815	57 46 3	2815	59 20 12	2815	60 54 20	2817
	α Pegasi W.	41 16 46	2821	42 34 58	2822	43 54 14	2813	45 14 24	2820
	Aldebaran E.	41 3 55	2826	39 25 36	2840	37 47 35	2852	36 9 51	2866
	Pollux E.	84 59 0	2577	83 19 33	2585	81 40 17	2594	80 1 14	2602
11	Venus W.	103 14 25	3068	104 43 16	3076	106 11 55	3085	107 40 23	3094
	Fomalhaut W.	68 44 16	2832	70 18 2	2837	71 51 42	2842	73 25 16	2846
	α Pegasi W.	52 5 37	2830	53 29 25	2830	54 53 37	2829	56 18 9	2828
	Pollux E.	71 48 50	2845	70 10 56	2853	68 33 13	2862	66 55 42	2870
	Regulus E.	108 1 0	2856	106 23 21	2863	104 45 52	2875	103 8 35	2880
	Jupiter E.	111 24 7	2859	109 46 32	2867	108 9 8	2879	106 31 55	2884
12	Fomalhaut W.	81 11 16	2878	82 44 3	2885	84 16 41	2893	85 49 9	2900
	α Pegasi W.	63 24 26	2920	64 50 11	2914	66 16 3	2911	67 41 59	2909
	Pollux E.	58 50 58	2713	57 14 36	2722	55 38 25	2730	54 2 25	2739
	Regulus E.	95 4 51	2721	93 28 39	2730	91 52 39	2738	90 16 49	2747
	Jupiter E.	98 28 30	2723	96 52 21	2732	95 16 23	2740	93 40 36	2748
13	Fomalhaut W.	93 28 57	2942	95 0 22	2952	96 31 35	2959	98 2 36	2971
	α Pegasi W.	74 52 4	2909	76 18 3	2912	77 43 58	2914	79 9 50	2919
	α Arietis W.	31 14 19	3161	32 41 15	3138	34 8 39	3118	35 36 27	3102
	Pollux E.	46 5 19	2783	44 30 29	2792	42 55 51	2801	41 21 25	2810
	Regulus E.	82 20 28	2788	80 45 45	2797	79 11 13	2805	77 36 52	2815
	Jupiter E.	85 44 23	2789	84 9 41	2798	82 35 10	2806	81 0 50	2815
14	α Pegasi W.	86 17 44	2947	87 42 57	2954	89 8 2	2963	90 32 57	2970
	α Arietis W.	42 59 13	3059	44 28 13	3056	45 57 17	3053	47 26 24	3052
	Pollux E.	33 32 13	2858	31 59 0	2867	30 25 59	2877	28 53 11	2888
	Regulus E.	69 47 58	2858	68 14 45	2866	66 41 43	2875	65 8 52	2883
	Jupiter E.	73 11 53	2857	71 38 39	2865	70 5 35	2873	68 32 42	2881
	Mars E.	112 21 15	3036	110 51 47	3045	109 22 30	3053	107 53 23	3062
15	α Arietis W.	54 52 2	3057	56 21 4	3060	57 50 3	3063	59 18 58	3067
	Aldebaran W.	23 54 32	3042	25 23 53	3034	26 53 23	3030	28 22 58	3027
	Regulus E.	57 27 24	2927	55 55 40	2936	54 24 7	2945	52 52 45	2954
	Jupiter E.	60 50 57	2924	59 19 8	2932	57 47 30	2940	56 16 2	2949
	Mars E.	100 30 25	3104	99 2 20	3112	97 34 25	3120	96 6 40	3128
	Spica E.	111 30 17	2929	109 58 35	2937	108 27 3	2944	101 55 40	2951
16	α Arietis W.	66 42 24	3087	68 10 49	3091	69 39 9	3097	71 7 22	3101
	Aldebaran W.	35 51 9	3033	37 20 41	3035	38 50 10	3039	40 19 35	3043
	Regulus E.	45 18 43	2998	43 48 28	2997	42 18 24	2916	40 48 31	2926
	Jupiter E.	48 41 21	2989	47 10 55	2998	45 40 40	3006	44 10 35	3014
	Mars E.	88 50 18	3168	87 23 30	3174	85 56 50	3182	84 30 19	3189
	Spica E.	99 21 3	2989	97 50 36	2995	96 20 17	3002	94 50 7	3009
17	α Arietis W.	78 27 3	3126	79 54 41	3130	81 22 14	3135	82 49 41	3140
	Aldebaran W.	47 45 31	3061	49 14 28	3065	50 43 20	3069	52 12 7	3073
	Regulus E.	33 21 57	3073	31 53 14	3082	30 24 43	3094	28 56 26	3106
	Jupiter E.	36 42 39	3055	35 13 34	3063	33 44 39	3071	32 15 54	3080
	Mars E.	77 19 48	3221	75 54 4	3228	74 28 27	3233	73 2 58	3240
	Spica E.	87 21 18	3040	85 51 55	3047	84 22 40	3052	82 53 32	3057
18	α Arietis W.	90 5 34	3161	91 32 30	3165	92 59 21	3168	94 26 8	3173
	Aldebaran W.	59 34 54	3091	61 3 15	3093	62 31 33	3096	63 59 48	3098

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
10	Fomalhaut W.	62° 28' 26"	2819	64° 2' 29"	2821	65° 36' 29"	2825	67° 10' 25"	2828
	α Pegasi W.	46 35 23	3432	47 57 3	3398	49 19 22	3369	50 42 14	3342
	Aldebaran E.	34 32 26	2681	32 55 20	2696	31 18 35	2712	29 42 11	2730
	Pollux E.	78 22 22	2611	76 43 42	2619	75 5 13	2628	73 26 56	2636
11	Venus W.	109 8 40	3104	110 36 45	3113	112 4 39	3122	113 32 22	3132
	Fomalhaut W.	74 58 44	2852	76 32 4	2859	78 5 16	2865	79 38 20	2871
	α Pegasi W.	57 42 58	2655	59 8 2	2643	60 33 20	2635	61 58 48	2626
	Pollux E.	65 18 22	2679	63 41 14	2687	62 4 17	2696	60 27 32	2704
	Regulus E.	101 31 28	2689	99 54 33	2696	98 17 48	2704	96 41 14	2713
	Jupiter E.	104 54 53	2692	103 18 2	2699	101 41 21	2707	100 4 51	2714
12	Fomalhaut W.	87 21 28	2909	88 53 36	2916	90 25 34	2925	91 57 21	2934
	α Pegasi W.	69 7 58	3207	70 33 59	3206	72 0 1	3206	73 26 3	3207
	Pollux E.	52 26 37	2747	50 51 0	2756	49 15 35	2765	47 40 21	2774
	Regulus E.	88 41 11	2754	87 5 43	2763	85 30 27	2772	83 55 22	2780
	Jupiter E.	92 5 0	2756	90 29 34	2764	88 54 19	2772	87 19 15	2782
13	Fomalhaut W.	99 33 25	2981	101 4 1	2992	102 34 24	3002	104 4 34	3013
	α Pegasi W.	80 35 37	3223	82 1 19	3229	83 26 54	3234	84 52 23	3241
	α Arietis W.	37 4 34	3069	38 32 57	3078	40 1 33	3070	41 30 19	3064
	Pollux E.	39 47 10	2819	38 13 7	2829	36 39 17	2838	35 5 39	2848
	Regulus E.	76 2 43	2823	74 28 45	2831	72 54 58	2840	71 21 22	2849
	Jupiter E.	79 26 41	2822	77 52 42	2831	76 18 55	2839	74 45 18	2848
14	α Pegasi W.	91 57 43	3280	93 22 18	3290	94 46 41	3300	96 10 53	3310
	α Arietis W.	48 55 32	3052	50 24 41	3052	51 53 50	3053	53 22 57	3055
	Pollux E.	27 20 37	2898	25 48 16	2910	24 16 10	2922	22 44 19	2935
	Regulus E.	63 36 12	2892	62 3 43	2901	60 31 26	2909	58 59 19	2919
	Jupiter E.	66 59 59	2890	65 27 27	2898	63 55 6	2907	62 22 56	2916
	Mars E.	106 24 27	3070	104 55 41	3078	103 27 5	3087	101 58 40	3096
15	α Arietis W.	.60 47 48	3070	62 16 34	3073	63 45 16	3078	65 13 53	3082
	Aldebaran W.	29 52 37	3026	31 22 17	3027	32 51 56	3028	34 21 34	3030
	Regulus E.	51 21 35	2982	49 50 35	2972	48 19 47	2980	46 49 9	2989
	Jupiter E.	54 44 45	2957	53 13 38	2965	51 42 42	2973	50 11 56	2982
	Mars E.	94 39 4	3136	93 11 38	3144	91 44 22	3152	90 17 15	3160
	Spica E.	105 24 26	2958	103 53 21	2966	102 22 26	2973	100 51 40	2979
16	α Arietis W.	72 35 30	3106	74 3 32	3111	75 31 28	3116	76 59 18	3120
	Aldebaran W.	41 48 55	3046	43 18 11	3049	44 47 23	3053	46 16 30	3058
	Regulus E.	39 18 50	3034	37 49 19	3043	36 20 0	3053	34 50 53	3062
	Jupiter E.	42 40 40	3022	41 10 55	3030	39 41 20	3039	38 11 55	3046
	Mars E.	83 3 57	3196	81 37 43	3203	80 11 37	3209	78 45 39	3215
	Spica E.	93 20 5	3015	91 50 11	3022	90 20 26	3028	88 50 48	3034
17	α Arietis W.	84 17 2	3144	85 44 18	3149	87 11 28	3153	88 38 33	3157
	Aldebaran W.	53 40 49	3077	55 9 27	3081	56 38 0	3084	58 6 29	3087
	Regulus E.	27 28 24	3119	26 0 37	3132	24 33 6	3146	23 5 52	3162
	Jupiter E.	30 47 20	3089	29 18 57	3099	27 50 46	3108	26 22 46	3118
	Mars E.	71 37 36	3244	70 12 19	3249	68 47 8	3253	67 22 2	3259
	Spica E.	81 24 30	3063	79 55 35	3068	78 26 46	3073	76 58 3	3077
18	α Arietis W.	95 52 50	3176	97 19 28	3178	98 46 3	3181	100 12 35	3184
	Aldebaran W.	65 28 0	3100	66 56 10	3102	68 24 17	3104	69 52 22	3105

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.		Noon.	P. L. of Diff.	IIIb.	P. L. of Diff.	VIb.	P. L. of Diff.	IXh.	P. L. of Diff.
18	Mars	E.	65 57 2	3263	64 32 7	3266	63 7 16	3270	61 42 30	3272
	Spica	E.	75 29 25	3081	74 0 52	3085	72 32 24	3089	71 4 1	3092
	SUN	E.	139 54 59	3454	138 33 43	3457	137 12 31	3462	135 51 24	3464
19	Aldebaran	W.	71 20 26	3105	72 48 29	3106	74 16 31	3106	75 44 33	3106
	Pollux	W.	27 6 53	3104	28 34 58	3102	30 3 5	3101	31 31 13	3100
	Mars	E.	54 39 34	3284	53 14 54	3285	51 50 25	3286	50 25 57	3286
	Spica	E.	63 43 2	3105	62 14 59	3107	60 46 58	3108	59 18 58	3110
	SUN	E.	129 6 32	3475	127 45 40	3476	126 24 49	3478	125 3 58	3477
20	Aldebaran	W.	83 4 52	3101	84 33 1	3098	86 1 13	3095	87 29 29	3091
	Pollux	W.	38 52 24	3089	40 20 47	3087	41 49 13	3083	43 17 43	3079
	Mars	E.	43 23 31	3282	41 58 58	3279	40 34 22	3276	39 9 43	3273
	Spica	E.	51 59 12	3110	50 31 14	3109	49 3 15	3107	47 35 14	3106
	SUN	E.	118 19 40	3471	116 58 43	3469	115 37 44	3465	114 16 41	3463
21	Aldebaran	W.	94 51 58	3069	96 20 45	3064	97 49 39	3057	99 18 41	3051
	Pollux	W.	50 41 34	3055	52 10 39	3048	53 39 52	3041	55 9 14	3034
	Mars	E.	32 5 25	3253	30 40 18	3247	29 15 4	3242	27 49 44	3235
	Spica	E.	40 14 40	3096	38 46 25	3092	37 18 6	3090	35 49 44	3087
	SUN	E.	107 30 18	3438	106 8 44	3431	104 47 2	3424	103 25 13	3416
22	Pollux	W.	62 38 25	2992	64 8 48	2982	65 39 23	2972	67 10 11	2961
	Regulus	W.	26 42 15	3056	28 11 18	3040	29 40 41	3025	31 10 23	3009
	Jupiter	W.	23 17 24	3051	24 46 34	3034	26 16 4	3018	27 45 55	3001
	Spica	E.	28 27 11	3079	26 58 36	3080	25 30 2	3061	24 1 29	3053
	SUN	E.	96 33 47	3372	95 10 58	3361	93 47 57	3351	92 24 44	3338
23	Pollux	W.	74 47 46	2901	76 20 4	2887	77 52 39	2873	79 25 32	2860
	Regulus	W.	38 43 42	2932	40 15 20	2917	41 47 17	2901	43 19 34	2886
	Jupiter	W.	35 20 12	2922	36 52 3	2907	38 24 13	2891	39 56 44	2875
	Antares	E.	61 55 24	2910	60 23 18	2897	58 50 55	2884	57 18 16	2870
	SUN	E.	85 25 5	3274	84 0 23	3259	82 35 24	3245	81 10 8	3230
24	Pollux	W.	87 14 35	2784	88 49 24	2768	90 24 34	2751	92 0 6	2735
	Regulus	W.	51 6 10	2803	52 40 34	2786	54 15 20	2769	55 50 29	2750
	Jupiter	W.	47 44 32	2792	49 19 11	2774	50 54 13	2757	52 29 37	2739
	Antares	E.	49 30 31	2798	47 56 1	2783	46 21 11	2768	44 46 1	2753
	SUN	E.	73 59 9	3148	72 31 57	3131	71 4 25	3113	69 36 31	3096
25	Pollux	W.	100 3 26	2647	101 41 17	2629	103 19 32	2611	104 58 12	2592
	Regulus	W.	63 52 10	2660	65 29 43	2641	67 7 42	2623	68 46 6	2604
	Jupiter	W.	60 32 37	2648	62 10 27	2629	63 48 42	2610	65 27 23	2591
	SUN	E.	62 11 25	3001	60 41 13	2981	59 10 37	2962	57 39 37	2942
26	Regulus	W.	77 4 34	2510	78 45 34	2490	80 27 1	2471	82 8 55	2453
	Jupiter	W.	73 47 19	2496	75 28 38	2477	77 10 23	2458	78 52 35	2440
	Mars	W.	28 7 24	2673	29 44 40	2653	31 22 23	2632	33 0 34	2619
	Spica	W.	23 22 3	2614	25 0 39	2581	26 40 0	2551	28 20 2	2522
	SUN	E.	49 58 20	2843	48 24 48	2824	46 50 51	2805	45 16 29	2785
27	Jupiter	W.	87 30 13	2347	89 15 4	2330	91 0 20	2312	92 46 2	2295
	Mars	W.	41 18 18	2515	42 59 11	2495	44 40 31	2477	46 22 17	2460
	Spica	W.	36 49 35	2400	38 33 10	2378	40 17 16	2357	42 1 52	2337
	SUN	E.	37 18 22	2692	35 41 31	2674	34 4 16	2657	32 26 38	2640

## GREENWICH MEAN TIME

## LUNAR DISTANCES.

Day of the Month.	Star's Name and Position.		Midnight.	P. L. of Diff.	XV <sup>h</sup> .	P. L. of Diff.	XVIII <sup>h</sup> .	P. L. of Diff.	XXI <sup>h</sup> .	P. L. of Diff.
18	Mars	E.	60 17 46	3278	58 53 6	3279	57 28 30	3281	56 3 56	3282
	Spica	E.	69 35 42	3096	68 7 27	3099	66 39 16	3101	65 11 8	3103
	SUN	E.	134 30 20	3467	133 9 19	3470	131 48 21	3471	130 27 25	3474
19	Aldebaran	W.	77 12 35	3105	78 40 38	3105	80 8 41	3104	81 36 46	3103
	Pollux	W.	32 59 23	3098	34 27 35	3096	35 55 49	3095	37 24 5	3092
	Mars	E.	49 1 29	3286	47 37 1	3285	46 12 32	3284	44 48 2	3283
	Spica	E.	57 51 0	3110	56 23 3	3110	54 55 6	3110	53 27 9	3110
	SUN	E.	123 43 8	3477	122 22 18	3476	121 1 27	3474	119 40 34	3473
20	Aldebaran	W.	88 57 49	3087	90 26 14	3084	91 54 43	3079	93 23 18	3075
	Pollux	W.	44 46 18	3075	46 14 58	3070	47 43 44	3065	49 12 36	3060
	Mars	E.	37 45 0	3270	36 20 13	3266	34 55 22	3262	33 30 26	3258
	Spica	E.	46 7 12	3105	44 39 8	3102	43 11 1	3101	41 42 52	3098
	SUN	E.	112 55 35	3458	111 34 24	3454	110 13 8	3448	108 51 46	3443
21	Aldebaran	W.	100 47 51	3043	102 17 10	3036	103 46 38	3038	105 16 16	3030
	Pollux	W.	56 38 44	3026	58 8 24	3019	59 38 13	3010	61 8 13	3001
	Mars	E.	26 24 16	3229	24 58 41	3222	23 32 58	3215	22 7 7	3209
	Spica	E.	34 21 18	3084	32 52 49	3082	31 24 18	3081	29 55 45	3080
	SUN	E.	102 3 15	3408	100 41 8	3400	99 18 51	3391	97 56 24	3382
22	Pollux	W.	68 41 13	2950	70 12 29	2939	71 43 59	2926	73 15 45	2914
	Regulus	W.	32 40 25	2994	34 10 45	2978	35 41 25	2963	37 12 24	2948
	Jupiter	W.	29 16 7	2985	30 46 39	2969	32 17 31	2954	33 48 42	2939
	Spica	E.	22 32 59	3090	21 4 37	3101	19 36 29	3118	18 8 41	3144
	SUN	E.	91 1 17	3396	89 37 36	3314	88 13 41	3301	86 49 31	3288
23	Pollux	W.	80 58 42	2845	82 32 11	2831	84 5 59	2815	85 40 7	2800
	Regulus	W.	44 52 11	2989	46 25 9	2953	47 58 28	2937	49 32 8	2920
	Jupiter	W.	41 29 35	2959	43 2 47	2942	44 36 20	2925	46 10 15	2908
	Antares	E.	55 45 19	2857	54 12 5	2842	52 38 32	2828	51 4 41	2814
	SUN	E.	79 44 34	3214	78 18 41	3198	76 52 30	3182	75 25 59	3166
24	Pollux	W.	93 36 0	2718	95 12 16	2700	96 48 56	2683	98 25 59	2665
	Regulus	W.	57 26 2	2733	59 1 58	2715	60 38 18	2697	62 15 2	2679
	Jupiter	W.	54 5 25	2729	55 41 36	2703	57 18 12	2685	58 55 12	2666
	Antares	E.	43 10 31	2737	41 34 40	2721	39 58 28	2706	38 21 56	2690
	SUN	E.	68 8 16	3077	66 39 38	3058	65 10 37	3039	63 41 13	3020
25	Pollux	W.	106 37 18	2574	108 16 49	2556	109 56 45	2537	111 37 7	2519
	Regulus	W.	70 24 56	2585	72 4 12	2566	73 43 53	2548	75 24 0	2528
	Jupiter	W.	67 6 30	2572	68 46 3	2553	70 26 2	2535	72 6 27	2515
	SUN	E.	56 8 12	2923	54 36 22	2902	53 4 6	2883	51 31 26	2863
26	Regulus	W.	83 51 15	2434	85 34 1	2415	87 17 14	2397	89 0 53	2379
	Jupiter	W.	80 35 13	2421	82 18 18	2402	84 1 50	2384	85 45 48	2365
	Mars	W.	34 39 12	2592	36 18 18	2572	37 57 51	2553	39 37 51	2533
	Spica	W.	30 0 45	2495	31 42 5	2470	33 24 1	2445	35 6 31	2422
	SUN	E.	43 41 42	2766	42 6 29	2747	40 30 51	2729	38 54 49	2710
27	Jupiter	W.	94 32 9	2278	96 18 41	2262	98 5 37	2246	99 52 56	2230
	Mars	W.	48 4 27	2441	49 47 3	2424	51 30 4	2407	53 13 29	2390
	Spica	W.	43 46 57	2318	45 32 30	2299	47 18 31	2281	49 4 59	2262
	SUN	E.	30 48 37	2624	29 10 15	2610	27 31 33	2596	25 52 32	2583



## GREENWICH MEAN TIME.

JANUARY.						FEBRUARY.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>o</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>	<sup>h</sup> <sup>m</sup>		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>o</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>	<sup>h</sup> <sup>m</sup>
1	15 34 47.15	11.464	16 24 2.7	-42.34	20 53.6	1	18 7 1.81	12.874	21 49 22.9	-5.84	21 24.1
2	15 39 23.04	11.527	16 40 50.5	41.62	20 54.2	2	18 12 11.04	12.893	21 51 25.0	4.31	21 25.3
3	15 44 0.42	11.588	16 57 20.7	40.86	20 54.9	3	18 17 20.69	12.910	21 52 50.3	2.78	21 26.5
4	15 48 39.26	11.650	17 13 32.3	40.07	20 55.6	4	18 22 30.71	12.924	21 53 38.6	-1.23	21 27.7
5	15 53 19.57	11.709	17 29 24.4	39.24	20 56.4	5	18 27 41.04	12.936	21 53 49.8	+0.31	21 29.0
6	15 58 1.31	11.769	17 44 56.2	38.37	20 57.2	6	18 32 51.63	12.944	21 53 23.7	1.87	21 30.2
7	16 2 44.47	11.828	18 0 6.8	37.47	20 58.0	7	18 38 2.39	12.951	21 52 20.2	3.44	21 31.5
8	16 7 29.02	11.885	18 14 55.2	36.54	20 58.8	8	18 43 13.29	12.955	21 50 39.0	5.00	21 32.7
9	16 12 14.95	11.941	18 29 20.9	35.57	20 59.7	9	18 48 24.27	12.957	21 48 20.2	6.57	21 34.0
10	16 17 2.21	11.997	18 43 22.9	34.57	21 0.5	10	18 53 35.27	12.957	21 45 23.8	8.14	21 35.2
11	16 21 50.80	12.051	18 57 0.5	33.54	21 1.4	11	18 58 46.23	12.954	21 41 49.8	9.71	21 36.4
12	16 26 40.67	12.105	19 10 12.9	32.47	21 2.3	12	19 3 57.09	12.949	21 37 38.0	11.27	21 37.7
13	16 31 31.83	12.157	19 22 59.4	31.37	21 3.2	13	19 9 7.81	12.943	21 32 48.8	12.84	21 38.9
14	16 36 24.22	12.208	19 35 19.1	30.25	21 4.2	14	19 14 18.34	12.933	21 27 22.0	14.40	21 40.1
15	16 41 17.83	12.258	19 47 11.5	29.09	21 5.1	15	19 19 28.61	12.922	21 21 17.9	15.96	21 41.3
16	16 46 12.62	12.307	19 58 35.8	27.90	21 6.1	16	19 24 38.59	12.909	21 14 36.6	17.50	21 42.6
17	16 51 8.56	12.355	20 9 31.3	26.68	21 7.1	17	19 29 48.23	12.893	21 7 18.3	19.04	21 43.8
18	16 56 5.62	12.401	20 19 57.3	25.45	21 8.2	18	19 34 57.48	12.877	20 59 23.1	20.57	21 45.0
19	17 1 3.77	12.445	20 29 53.3	24.18	21 9.3	19	19 40 6.31	12.858	20 50 51.3	22.09	21 46.2
20	17 6 2.98	12.488	20 39 18.6	22.90	21 10.3	20	19 45 14.67	12.837	20 41 43.1	23.59	21 47.4
21	17 11 3.21	12.530	20 48 12.8	21.58	21 11.4	21	19 50 22.51	12.816	20 31 58.8	25.10	21 48.6
22	17 16 4.42	12.571	20 56 35.2	20.25	21 12.5	22	19 55 29.81	12.792	20 21 38.8	26.58	21 49.7
23	17 21 6.59	12.609	21 4 25.3	18.89	21 13.6	23	20 0 36.53	12.766	20 10 43.2	28.05	21 50.9
24	17 26 9.66	12.646	21 11 42.5	17.51	21 14.7	24	20 5 42.63	12.741	19 59 12.5	29.51	21 52.0
25	17 31 13.60	12.680	21 18 26.4	16.11	21 15.8	25	20 10 48.08	12.713	19 47 7.1	30.96	21 53.1
26	17 36 18.38	12.715	21 24 36.5	14.69	21 17.0	26	20 15 52.85	12.684	19 34 27.3	32.37	21 54.3
27	17 41 23.94	12.747	21 30 12.2	13.26	21 18.1	27	20 20 56.92	12.654	19 21 13.4	33.79	21 55.4
28	17 46 30.24	12.777	21 35 13.3	11.81	21 19.3	28	20 26 0.24	12.622	19 7 26.0	35.18	21 56.5
29	17 51 37.22	12.805	21 39 39.3	10.34	21 20.5	29	20 31 2.79	12.590	18 53 5.4	36.55	21 57.6
30	17 56 44.85	12.830	21 43 29.8	8.86	21 21.7	30	20 36 4.54	12.556	18 38 12.1	37.89	21 58.7
31	18 1 53.06	12.853	21 46 44.4	7.35	21 22.9	31	20 41 5.49	12.521	18 22 46.7	39.22	21 59.8
32	18 7 1.81	12.874	21 49 22.9	-5.84	21 24.1	32	20 46 5.59	12.486	18 6 49.6	+40.53	22 0.8
Day of the Month.						Day of the Month.					
	1st.	6th.	11th.	16th.	21st.		1st.	6th.	11th.	16th.	21st.
Semidiameter	9.8	9.4	9.1	8.7	8.4	Semidiameter	7.8	7.6	7.4	7.2	7.0
Hor. Parallax	10.2	9.8	9.4	9.0	8.7	Hor. Parallax	8.1	7.9	7.6	7.4	7.2

NOTE.—North declinations are marked +, south declinations —

## GREENWICH MEAN TIME.

MARCH.						APRIL.							
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.		
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.			
1	20 36 4.54	12.556	18 38 12.1	+37.89	21 58.7	1	23 4 37.61	11.463	7 19 50.3	+67.22	22 24.6		
2	20 41 5.49	12.591	18 22 46.7	38.22	21 59.8	2	23 9 12.43	11.430	6 52 50.8	67.72	22 25.2		
3	20 46 5.59	12.486	18 6 49.6	40.53	22 0.8	3	23 13 46.70	11.417	6 25 39.6	68.20	22 25.8		
4	20 51 4.84	12.450	17 50 21.5	41.81	22 1.8	4	23 18 20.44	11.396	5 58 17.3	68.64	22 26.5		
5	20 56 3.20	12.413	17 33 22.7	43.08	22 2.8	5	23 22 53.69	11.376	5 30 44.7	69.06	22 27.1		
6	21 1 0.68	12.375	17 15 53.9	44.32	22 3.8	6	23 27 26.47	11.357	5 3 2.4	69.45	22 27.6		
7	21 5 57.23	12.337	16 57 55.6	45.54	22 4.8	7	23 31 58.82	11.340	4 35 11.1	69.81	22 28.2		
8	21 10 52.86	12.298	16 39 28.3	46.72	22 5.8	8	23 36 30.78	11.324	4 7 11.6	70.13	22 28.8		
9	21 15 47.56	12.259	16 20 32.7	47.89	22 6.7	9	23 41 2.36	11.309	3 39 4.5	70.43	22 29.4		
10	21 20 41.31	12.219	16 1 9.6	49.03	22 7.7	10	23 45 33.61	11.296	3 10 50.5	70.70	22 29.9		
11	21 25 34.11	12.179	15 41 19.5	50.15	22 8.6	11	23 50 4.56	11.286	2 42 30.5	70.95	22 30.5		
12	21 30 25.95	12.139	15 21 2.9	51.23	22 9.5	12	23 54 35.23	11.275	2 14 4.9	71.16	22 31.1		
13	21 35 16.83	12.100	15 0 20.4	52.29	22 10.4	13	23 59 5.69	11.265	1 45 34.5	71.34	22 31.6		
14	21 40 6.75	12.060	14 39 13.0	53.32	22 11.2	14	0 3 35.95	11.257	1 17 0.0	71.50	22 32.2		
15	21 44 55.75	12.021	14 17 41.0	54.33	22 12.1	15	0 8 6.05	11.252	0 48 22.3	71.63	22 32.8		
16	21 49 43.80	11.982	13 55 45.1	55.30	22 13.0	16	0 12 36.04	11.248	0 19 41.7	71.73	22 33.4		
17	21 54 30.91	11.944	13 33 26.2	56.26	22 13.8	17	0 17 5.94	11.245	0 9 1.0	71.81	22 33.9		
18	21 59 17.11	11.906	13 10 44.8	57.18	22 14.6	18	0 21 35.81	11.245	0 37 45.0	71.85	22 34.5		
19	22 4 2.40	11.868	12 47 41.4	58.08	22 15.4	19	0 26 5.69	11.246	1 6 29.7	71.86	22 35.0		
20	22 8 46.79	11.832	12 24 16.7	58.95	22 16.2	20	0 30 35.60	11.248	1 35 14.4	71.84	22 35.6		
21	22 13 30.31	11.795	12 0 31.6	59.80	22 16.9	21	0 35 5.60	11.252	2 3 58.5	71.81	22 36.1		
22	22 18 12.97	11.760	11 36 26.6	60.61	22 17.7	22	0 39 35.72	11.258	2 32 41.3	71.74	22 36.7		
23	22 22 54.80	11.726	11 12 2.4	61.39	22 18.4	23	0 44 6.00	11.266	3 1 22.1	71.64	22 37.3		
24	22 27 35.83	11.693	10 47 19.7	62.15	22 19.2	24	0 48 36.49	11.275	3 30 0.3	71.52	22 37.8		
25	22 32 16.06	11.660	10 22 19.1	62.88	22 19.9	25	0 53 7.21	11.286	3 58 35.1	71.37	22 38.4		
26	22 36 55.52	11.628	9 57 1.2	63.58	22 20.6	26	0 57 38.22	11.299	4 27 6.0	71.19	22 39.0		
27	22 41 34.24	11.598	9 31 26.8	64.26	22 21.3	27	1 2 9.56	11.313	4 55 32.2	70.98	22 39.6		
28	22 46 12.24	11.569	9 5 36.5	64.91	22 22.0	28	1 6 41.26	11.328	5 23 53.0	70.74	22 40.2		
29	22 50 49.55	11.541	8 39 31.1	65.53	22 22.6	29	1 11 13.35	11.346	5 52 7.8	70.47	22 40.8		
30	22 55 26.20	11.514	8 13 11.0	66.11	22 23.3	30	1 15 45.87	11.366	6 20 15.8	70.18	22 41.4		
31	23 0 2.21	11.488	7 46 37.2	66.68	22 24.0	31	1 20 18.88	11.386	6 48 16.4	69.85	22 42.0		
32	23 4 37.61	11.463	7 19 50.3	+67.22	22 24.6	32	1 24 52.38	11.407	+ 7 16 8.7	+69.50	22 42.6		
Day of the Month,	1st.	6th.	11th.	16th.	21st.	26th.	Day of the Month,	1st.	6th.	11th.	16th.	21st.	26th.
Semidiameter	6.8	6.6	6.4	6.3	6.2	6.0	Semidiameter	5.9	5.8	5.7	5.7	5.6	5.5
Hor. Parallax	7.0	6.8	6.7	6.5	6.4	6.2	Hor. Parallax	6.1	6.0	5.9	5.8	5.7	5.6

+ prefixed to the hourly change of declination, indicates that north declinations are increasing, and south declinations are decreasing: — indicates that north declinations are decreasing, south declinations increasing.

2	1 24 52.38	11.407	7 16 8.7	66.50	22 42.6	2	3 52 59.18	12.615	19 27 30.0	43.71	23 9.0
3	1 29 26.43	11.431	7 43 52.3	66.12	22 43.3	3	3 58 2.51	12.600	19 44 43.5	42.41	23 10.1
4	1 34 1.05	11.454	8 11 26.3	65.70	22 43.9	4	4 3 6.94	12.577	20 1 25.4	41.06	23 11.3
5	1 38 36.28	11.481	8 38 49.9	65.25	22 44.6	5	4 8 12.45	12.553	20 17 35.2	39.73	23 12.5
6	1 43 12.15	11.506	9 6 2.6	64.78	22 45.2	6	4 13 19.04	12.527	20 33 12.2	38.35	23 13.7
7	1 47 48.69	11.537	9 33 3.6	64.36	22 45.9	7	4 18 26.67	12.500	20 48 15.7	36.95	23 14.9
8	1 52 25.94	11.567	9 59 52.0	63.93	22 46.6	8	4 23 35.34	12.472	21 2 45.3	35.51	23 16.1
9	1 57 3.91	11.598	10 26 27.2	63.50	22 47.3	9	4 28 45.02	12.444	21 16 40.2	34.06	23 17.3
10	2 1 42.65	11.630	10 52 48.4	63.08	22 48.0	10	4 33 55.67	12.416	21 29 59.9	32.57	23 18.6
11	2 6 22.17	11.664	11 18 55.0	62.65	22 48.7	11	4 39 7 27	12.388	21 42 43.7	31.07	23 19.8
12	2 11 2.52	11.699	11 44 46.2	62.23	22 49.4	12	4 44 19.79	12.360	21 54 51.2	29.57	23 21.1
13	2 15 43.71	11.735	12 10 21.4	61.80	22 50.2	13	4 49 33.21	12.332	22 6 21.8	28.07	23 22.4
14	2 20 25.76	11.772	12 35 39.9	61.38	22 51.0	14	4 54 47.46	12.304	22 17 15.2	26.54	23 23.7
15	2 25 8.73	11.810	13 0 40.7	60.95	22 51.8	15	5 0 2.54	12.276	22 27 30.7	25.00	23 25.1
16	2 29 52.63	11.848	13 25 23.4	60.53	22 52.6	16	5 5 18.40	12.248	22 37 8.0	23.45	23 26.4
17	2 34 37.48	11.889	13 49 47.3	60.10	22 53.4	17	5 10 35.00	12.220	22 46 6.5	21.89	23 27.8
18	2 39 23.29	11.930	14 13 51.3	59.68	22 54.3	18	5 15 52.31	12.192	22 54 25.9	19.98	23 29.1
19	2 44 10.11	11.972	14 37 34.9	59.25	22 55.1	19	5 21 10.27	12.164	23 2 5.8	18.33	23 30.5
20	2 48 57.94	12.015	15 0 57.3	58.83	22 56.0	20	5 26 28.85	12.136	23 9 5.8	16.66	23 31.9
21	2 53 46.81	12.057	15 23 57.9	58.40	22 56.9	21	5 31 48.01	12.108	23 15 25.7	14.99	23 33.3
22	2 58 36.75	12.103	15 46 36.1	58.00	22 57.8	22	5 37 7.68	12.080	23 21 5.1	13.29	23 34.6
23	3 3 27.76	12.148	16 8 51.2	57.59	22 58.7	23	5 42 27.83	12.052	23 26 3.6	11.59	23 36.0
24	3 8 19.86	12.193	16 30 42.2	57.18	22 59.6	24	5 47 48.40	12.024	23 30 21.1	9.87	23 37.4
25	3 13 13.05	12.240	16 52 8.6	56.77	23 0.6	25	5 53 9.34	12.000	23 33 57.3	8.15	23 38.8
26	3 18 7.37	12.286	17 13 9.8	56.36	23 1.6	26	5 58 30.60	12.000	23 36 51.7	6.41	23 40.2
27	3 23 2.80	12.333	17 33 44.9	55.95	23 2.6	27	6 3 52.12	12.000	23 39 4.6	4.68	23 41.7
28	3 27 59.36	12.381	17 53 53.3	55.54	23 3.6	28	6 9 13.85	12.000	23 40 36.1	2.93	23 43.1
29	3 32 57.06	12.428	18 13 34.4	55.13	23 4.6	29	6 14 35.73	12.000	23 41 25.5 + 1.18		23 44.5
30	3 37 55.00	12.476	18 32 47.1	54.72	23 5.7	30	6 19 57.71	12.000	23 41 32.5 - 0.57		23 45.9
31	3 42 55.86	12.523	18 51 31.1	54.31	23 6.8	31	6 25 19.73	12.000	23 40 57.6		23 47.3
32	3 47 56.96	12.569	19 9 45.6 + 44.96		23 7.9	32	6 30 41.72	12.000	23 39 40.5 - 4.08		23 48.8

	11th.	16th.	21st.	26th.	Day of the Month,	1st.	6th.	11th.	16th.	21st.	26th.
Semidiameter	5.3	5.2	5.2	5.1		5.1	5.1	5.0	5.0	5.0	5.0
Hor. Parallax	5.5	5.4	5.4	5.3		5.3	5.3	5.2	5.2	5.2	5.1

NOTE.—North declinations are marked +, south declinations —.

## GREENWICH MEAN TIME.

JULY.						AUGUST.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"			h m s	s	° ' "	"	
1	6 25 19.73	13.416	+23 40 57.6	-2.33	23 47.3	1	9 7 16.32	12.480	+17 52 26.4	-51.16	0 25.7
2	6 30 41.72	13.414	23 39 40.5	4.06	23 48.8	2	9 12 14.80	12.413	17 31 43.5	52.30	0 26.7
3	6 36 3.61	13.409	23 37 41.3	5.84	23 50.2	3	9 17 12.14	12.366	17 10 31.4	53.50	0 27.7
4	6 41 25.37	13.400	23 35 0.0	7.59	23 51.6	4	9 22 8.36	12.319	16 48 50.7	54.77	0 28.7
5	6 46 46.93	13.392	23 31 36.7	9.34	23 53.0	5	9 27 34.5	12.271	16 26 42.1	55.92	0 29.7
6	6 52 8.22	13.380	23 27 31.5	11.06	23 54.5	6	9 31 57.39	12.224	16 4 6.4	57.03	0 30.6
7	6 57 29.20	13.366	23 22 44.5	12.82	23 55.9	7	9 36 50.31	12.178	15 41 4.3	58.18	0 31.5
8	7 2 49.80	13.349	23 17 15.9	14.55	23 57.3	8	9 41 41.91	12.131	15 17 36.4	59.18	0 32.4
9	7 8 9.97	13.330	23 11 5.8	16.27	23 58.7	9	9 46 32.52	12.086	14 53 43.5	60.31	0 33.4
10	7 13 29.65	13.309	23 4 14.5	17.99		10	9 51 23.03	12.041	14 29 26.3	61.30	0 34.3
11	7 18 48.78	13.285	22 56 42.1	19.68	0 0.0	11	9 56 10.47	11.997	14 4 45.6	62.16	0 35.1
12	7 24 7.33	13.259	22 48 29.2	21.37	0 1.4	12	10 0 57.85	11.953	13 39 42.0	63.10	0 36.0
13	7 29 25.23	13.232	22 39 35.8	23.05	0 2.7	13	10 5 44.18	11.910	13 14 16.4	64.00	0 36.8
14	7 34 42.45	13.203	22 30 2.5	24.71	0 4.1	14	10 10 29.50	11.867	12 48 29.4	64.88	0 37.6
15	7 39 58.95	13.171	22 19 49.4	26.35	0 5.4	15	10 15 13.81	11.827	12 22 21.7	65.72	0 38.4
16	7 45 14.67	13.138	22 8 57.0	27.99	0 6.7	16	10 19 57.16	11.787	11 55 54.2	66.54	0 39.2
17	7 50 29.57	13.104	21 57 25.7	29.60	0 8.0	17	10 24 39.56	11.749	11 29 7.5	67.31	0 39.9
18	7 55 43.62	13.069	21 45 16.0	31.19	0 9.3	18	10 29 21.04	11.711	11 2 2.3	68.08	0 40.7
19	8 0 56.80	13.032	21 32 23.2	32.77	0 10.6	19	10 34 1.64	11.674	10 34 39.5	68.80	0 41.4
20	8 6 9.06	12.991	21 19 2.9	34.31	0 11.9	20	10 38 41.38	11.638	10 6 59.5	69.49	0 42.1
21	8 11 20.38	12.958	21 5 0.6	35.81	0 13.1	21	10 43 20.31	11.605	9 39 3.4	70.15	0 42.8
22	8 16 30.73	12.910	20 50 21.7	37.36	0 14.3	22	10 47 58.44	11.573	9 10 51.6	70.79	0 43.6
23	8 21 40.08	12.868	20 35 6.9	38.85	0 15.5	23	10 52 35.82	11.543	8 42 25.1	71.39	0 44.3
24	8 26 48.41	12.822	20 19 16.6	40.29	0 16.7	24	10 57 12.47	11.513	8 13 44.3	71.97	0 44.9
25	8 31 55.69	12.782	20 2 51.2	41.76	0 17.9	25	11 1 48.44	11.486	7 44 50.1	72.51	0 45.5
26	8 37 1.92	12.738	19 45 51.5	43.17	0 19.1	26	11 6 23.77	11.460	7 15 43.3	73.01	0 46.2
27	8 42 7.09	12.692	19 28 18.1	44.57	0 20.2	27	11 10 58.49	11.435	6 46 24.5	73.51	0 46.8
28	8 47 11.15	12.647	19 10 11.5	45.95	0 21.4	28	11 15 32.63	11.410	6 16 54.4	73.96	0 47.4
29	8 52 14.12	12.600	18 51 32.4	47.38	0 22.5	29	11 20 6.24	11.386	5 47 13.8	74.38	0 47.9
30	8 57 15.96	12.554	18 32 21.4	48.81	0 23.6	30	11 24 39.34	11.370	5 17 23.4	74.78	0 48.7
31	9 2 16.71	12.507	18 12 39.2	49.90	0 24.6	31	11 29 11.99	11.352	4 47 23.0	75.14	0 49.3
32	9 7 16.32	12.460	+17 52 26.4	-51.16	0 25.7	32	11 33 44.21	11.330	+ 4 17 16.2	-75.48	0 49.9

Day of the Month,	1st.	10th.	15th.	21st.	30th.	Day of the Month,	1st.
Semidiameter	5.0	4.9	4.9	4.9	5.0	Semidiameter	5.0
Hor. Parallax	5.1	5.1	5.1	5.1	5.1	Hor. Parallax	5.1

+ prefixed to the hourly change of declination, indicates that north declinations are increasing, and south declinations are decreasing; - indicates that north declinations are decreasing, south declinations increasing.

## GREENWICH MEAN TIME.

SEPTEMBER.						OCTOBER.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	"	° ' "	"	h m		h m s	"	° ' "	"	h m
1	11 33 44.21	11.335	+ 4 17 16.2	-75.48	0 49.9	1	13 49 57.57	11.634	-10 50 24.3	-71.20	1 7.8
2	11 38 16.06	11.319	3 47 0.7	75.78	0 50.5	2	13 54 37.20	11.670	11 18 45.6	70.57	1 8.6
3	11 42 47.55	11.306	3 16 38.5	76.05	0 51.1	3	13 59 17.73	11.707	11 46 51.6	69.91	1 9.3
4	11 47 18.74	11.294	2 46 10.2	76.29	0 51.7	4	14 3 59.15	11.745	12 14 41.4	69.22	1 10.0
5	11 51 49.65	11.284	2 15 36.5	76.50	0 52.2	5	14 8 41.52	11.785	12 42 14.0	68.49	1 10.8
6	11 56 20.35	11.275	1 44 58.2	76.67	0 52.8	6	14 13 24.86	11.826	13 9 29.0	67.74	1 11.6
7	12 0 50.85	11.268	1 14 15.9	76.82	0 53.4	7	14 18 9.19	11.868	13 36 25.3	66.94	1 12.4
8	12 5 21.22	11.263	0 43 30.5	76.94	0 53.9	8	14 22 54.55	11.911	14 3 2.2	66.11	1 13.2
9	12 9 51.47	11.260	+ 0 12 42.6	77.02	0 54.5	9	14 27 40.94	11.955	14 29 19.0	65.26	1 14.0
10	12 14 21.66	11.258	- 0 18 6.9	77.08	0 55.0	10	14 32 28.41	12.000	14 55 14.7	64.36	1 14.9
11	12 18 51.83	11.258	0 48 57.5	77.11	0 55.6	11	14 37 16.96	12.046	15 20 48.7	63.44	1 15.8
12	12 23 22.02	11.260	1 19 48.2	77.10	0 56.2	12	14 42 6.63	12.093	15 46 0.0	62.49	1 16.7
13	12 27 52.27	11.263	1 50 38.4	77.06	0 56.7	13	14 46 57.44	12.140	16 10 48.0	61.50	1 17.6
14	12 32 22.63	11.268	2 21 27.3	77.00	0 57.2	14	14 51 49.41	12.189	16 35 11.8	60.47	1 18.5
15	12 36 53.14	11.275	2 52 14.3	76.90	0 57.8	15	14 56 42.55	12.238	16 59 10.7	59.42	1 19.4
16	12 41 23.85	11.285	3 22 58.7	76.77	0 58.3	16	15 1 36.87	12.288	17 22 43.6	58.33	1 20.4
17	12 45 54.80	11.296	3 53 39.5	76.61	0 58.9	17	15 6 32.39	12.338	17 45 50.6	57.21	1 21.4
18	12 50 26.03	11.308	4 24 16.3	76.42	0 59.5	18	15 11 29.12	12.389	18 8 30.1	56.06	1 22.4
19	12 54 57.60	11.323	4 54 48.1	76.21	1 0.1	19	15 16 27.08	12.440	18 30 41.5	54.86	1 23.4
20	12 59 29.53	11.339	5 25 14.4	75.96	1 0.7	20	15 21 26.26	12.492	18 52 24.1	53.67	1 24.5
21	13 4 1.88	11.358	5 55 34.4	75.68	1 1.3	21	15 26 26.68	12.543	19 13 37.2	52.41	1 25.6
22	13 8 34.70	11.378	6 25 47.3	75.38	1 1.9	22	15 31 28.33	12.595	19 34 19.9	51.13	1 26.6
23	13 13 8.02	11.399	6 55 52.5	75.04	1 2.5	23	15 36 31.22	12.646	19 54 31.7	49.82	1 27.7
24	13 17 41.88	11.423	7 25 49.2	74.66	1 3.1	24	15 41 35.35	12.697	20 14 11.8	48.49	1 28.9
25	13 22 16.33	11.448	7 55 36.5	74.27	1 3.7	25	15 46 40.70	12.748	20 33 19.2	47.12	1 30.0
26	13 26 51.41	11.475	8 25 14.0	73.84	1 4.3	26	15 51 47.26	12.799	20 51 53.4	45.73	1 31.2
27	13 31 27.15	11.504	8 54 40.8	73.37	1 5.0	27	15 56 55.05	12.848	21 9 53.8	44.30	1 32.4
28	13 36 3.60	11.534	9 23 55.8	72.87	1 5.7	28	16 2 4.01	12.897	21 27 19.4	42.84	1 33.6
29	13 40 40.80	11.568	9 52 58.6	72.35	1 6.4	29	16 7 14.15	12.945	21 44 9.7	41.35	1 34.8
30	13 45 18.77	11.600	10 21 48.4	71.79	1 7.1	30	16 12 25.43	12.992	22 0 23.9	39.83	1 36.0
31	13 49 57.57	11.634	10 50 24.3	71.20	1 7.8	31	16 17 37.83	13.039	22 16 1.4	38.29	1 37.3
32	13 54 37.20	11.670	-11 18 45.6	-70.57	1 8.6	32	16 22 51.32	13.084	-22 31 1.6	-36.72	1 38.6
Day of the Month, 1st. 6th. 11th. 16th. 21st. 26th.						Day of the Month, 1st. 6th. 11th. 16th. 21st. 26th.					
Semidiameter 5.1 5.1 5.2 5.2 5.3 5.4						Semidiameter 5.5 5.5 5.6 5.7 5.8 5.9					
Hor. Parallax 5.3 5.3 5.4 5.4 5.5 5.6						Hor. Parallax 5.7 5.7 5.8 5.9 6.0 6.1					

NOTE.—North declinations are marked +, south declinations —.

## GREENWICH MEAN TIME.

NOVEMBER.						DECEMBER.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>o</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>	<sup>h</sup> <sup>m</sup>		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>o</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>	<sup>h</sup> <sup>m</sup>
1	16 22 51.32	13.084	22 31 1.6	-36.79	1 38.6	1	19 3 57.60	13.379	24 34 9.9	+17.38	2 21.5
2	16 28 5.89	13.128	22 45 23.7	35.12	1 39.9	2	19 9 18.32	13.346	24 26 50.1	19.21	2 22.9
3	16 33 21.47	13.170	22 59 7.2	33.50	1 41.3	3	19 14 38.23	13.311	24 18 47.0	21.01	2 24.3
4	16 38 38.05	13.210	23 12 11.4	31.85	1 42.6	4	19 19 57.26	13.273	24 10 0.8	22.80	2 25.7
5	16 43 55.56	13.248	23 24 35.8	30.18	1 43.9	5	19 25 15.36	13.233	24 0 31.9	24.56	2 27.0
6	16 49 13.96	13.284	23 36 19.7	28.48	1 45.3	6	19 30 32.45	13.191	23 50 20.7	26.31	2 28.4
7	16 54 33.21	13.318	23 47 22.7	26.77	1 46.7	7	19 35 48.50	13.145	23 39 27.8	28.04	2 29.7
8	16 59 53.26	13.350	23 57 44.4	25.03	1 48.0	8	19 41 3.43	13.099	23 27 53.7	29.74	2 31.0
9	17 5 14.06	13.380	24 7 24.2	23.27	1 49.4	9	19 46 17.20	13.049	23 15 38.8	31.43	2 32.3
10	17 10 35.55	13.408	24 16 21.7	21.50	1 50.8	10	19 51 29.77	12.998	23 2 43.8	33.10	2 33.5
11	17 15 57.67	13.433	24 24 36.4	19.71	1 52.3	11	19 56 41.08	12.944	22 49 9.1	34.75	2 34.8
12	17 21 20.38	13.456	24 32 8.1	17.91	1 53.7	12	20 1 51.08	12.890	22 34 55.3	36.36	2 36.0
13	17 26 43.60	13.477	24 38 56.1	16.09	1 55.2	13	20 6 59.75	12.834	22 20 3.0	37.95	2 37.2
14	17 32 7.29	13.495	24 45 0.4	14.26	1 56.6	14	20 12 7.06	12.776	22 4 33.0	39.52	2 38.4
15	17 37 31.37	13.510	24 50 20.9	12.43	1 58.1	15	20 17 12.96	12.717	21 48 25.7	41.06	2 39.5
16	17 42 55.79	13.523	24 54 56.9	10.57	1 59.6	16	20 22 17.43	12.657	21 31 41.9	42.56	2 40.6
17	17 48 20.49	13.533	24 58 48.3	8.71	2 1.0	17	20 27 20.45	12.598	21 14 22.2	44.05	2 41.8
18	17 53 45.40	13.540	25 1 55.0	6.84	2 2.5	18	20 32 21.98	12.534	20 56 27.3	45.49	2 42.9
19	17 59 10.44	13.545	25 4 16.8	4.98	2 4.0	19	20 37 22.03	12.471	20 37 58.1	46.92	2 43.9
20	18 4 35.57	13.547	25 5 53.6	3.11	2 5.5	20	20 42 20.56	12.407	20 18 54.9	48.31	2 44.9
21	18 10 0.71	13.546	25 6 45.4	-1.23	2 7.0	21	20 47 17.56	12.343	19 59 18.7	49.67	2 45.9
22	18 15 25.80	13.542	25 6 52.0	+0.65	2 8.5	22	20 52 13.01	12.278	19 39 10.1	51.00	2 46.9
23	18 20 50.76	13.536	25 6 13.6	2.54	2 10.0	23	20 57 6.91	12.215	19 18 30.0	52.31	2 47.9
24	18 26 15.52	13.526	25 4 49.9	4.41	2 11.5	24	21 1 59.26	12.149	18 57 19.0	53.58	2 48.8
25	18 31 40.02	13.514	25 2 41.2	6.29	2 12.9	25	21 6 50.03	12.084	18 35 38.0	54.82	2 49.7
26	18 37 4.19	13.499	24 59 47.5	8.16	2 14.4	26	21 11 39.23	12.018	18 13 27.5	56.03	2 50.6
27	18 42 27.95	13.480	24 56 9.0	10.02	2 15.7	27	21 16 26.86	11.952	17 50 48.5	57.20	2 51.4
28	18 47 51.25	13.459	24 51 45.7	11.88	2 17.2	28	21 21 12.91	11.886	17 27 41.7	58.35	2 52.2
29	18 53 14.00	13.435	24 46 38.0	13.73	2 18.6	29	21 25 57.39	11.820	17 4 7.9	59.46	2 53.0
30	18 58 36.14	13.408	24 40 45.9	15.56	2 20.1	30	21 30 40.28	11.755	16 40 7.8	60.53	2 53.8
31	19 3 57.60	13.379	24 34 9.9	17.38	2 21.5	31	21 35 21.60	11.689	16 15 42.3	61.57	2 54.5
32	19 9 18.32	13.346	24 26 50.1	+19.21	2 22.9	32	21 40 1.34	11.623	15 50 52.2	+62.58	2 55.3
Day of the Month, 1st. 6th. 11th. 16th. 21st. 26th.						Day of the Month, 1st. 6th. 11th. 16th. 21st. 26th.					
Semidiameter 6.0 6.1 6.2 6.3 6.5 6.6						Semidiameter 6.7 6.9 7.1 7.3 7.5 7.7					
Hor. Parallax 6.2 6.3 6.4 6.5 6.7 6.8						Hor. Parallax 7.0 7.1 7.3 7.5 7.7 8.0					

+ prefixed to the hourly change of declination, indicates that north declinations are increasing, and south declinations are decreasing; - indicates that north declinations are decreasing, south declinations increasing.

## GREENWICH MEAN TIME.

JANUARY.						FEBRUARY.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m
1	21 1 28.37	+7.994	18 9 54.8	+34.25	2 19.6	1	22 36 11.14	+7.367	9 49 55.2	+44.96	1 52.1
2	21 4 38.32	7.905	17 56 7.1	34.73	2 18.8	2	22 39 7.77	7.359	9 31 53.0	45.00	1 51.1
3	21 7 47.82	7.887	17 42 8.1	35.19	2 18.0	3	22 42 4.05	7.337	9 13 45.9	45.00	1 50.1
4	21 10 56.88	7.868	17 27 58.0	35.65	2 17.2	4	22 44 59.97	7.323	8 55 34.2	45.00	1 49.0
5	21 14 5.49	7.850	17 13 36.9	36.11	2 16.4	5	22 47 55.55	7.300	8 37 18.0	45.77	1 48.0
6	21 17 13.67	7.831	16 59 5.1	36.55	2 15.6	6	22 50 50.80	7.280	8 18 57.5	45.94	1 47.0
7	21 20 21.40	7.813	16 44 22.7	36.98	2 14.8	7	22 53 45.71	7.261	8 0 33.0	46.11	1 46.0
8	21 23 28.69	7.794	16 29 30.0	37.41	2 14.0	8	22 56 40.30	7.267	7 42 4.6	46.30	1 44.9
9	21 26 35.54	7.776	16 14 27.1	37.83	2 13.1	9	22 59 34.57	7.254	7 23 32.6	46.41	1 43.9
10	21 29 41.94	7.757	15 59 14.3	38.24	2 12.3	10	23 2 28.52	7.241	7 4 57.2	46.55	1 42.9
11	21 32 47.89	7.738	15 43 51.8	38.64	2 11.5	11	23 5 22.17	7.229	6 46 18.5	46.69	1 41.8
12	21 35 53.38	7.719	15 28 19.8	39.03	2 10.6	12	23 8 15.51	7.216	6 27 36.9	46.80	1 40.8
13	21 38 58.42	7.700	15 12 38.5	39.41	2 9.8	13	23 11 8.55	7.204	6 8 52.5	46.91	1 39.7
14	21 42 3.00	7.681	14 56 48.2	39.79	2 8.9	14	23 14 1.30	7.192	5 50 5.6	47.01	1 38.6
15	21 45 7.13	7.663	14 40 48.9	40.15	2 8.0	15	23 16 53.76	7.180	5 31 16.3	47.10	1 37.6
16	21 48 10.82	7.645	14 24 40.9	40.51	2 7.1	16	23 19 45.95	7.168	5 12 24.8	47.18	1 36.5
17	21 51 14.07	7.627	14 8 24.6	40.85	2 6.2	17	23 22 37.87	7.156	4 53 31.5	47.26	1 35.4
18	21 54 16.88	7.608	13 52 0.1	41.19	2 5.3	18	23 25 29.53	7.147	4 34 36.4	47.33	1 34.3
19	21 57 19.24	7.589	13 35 27.6	41.52	2 4.4	19	23 28 20.93	7.137	4 15 39.8	47.39	1 33.3
20	22 0 21.14	7.570	13 18 47.3	41.84	2 3.5	20	23 31 12.08	7.127	3 56 41.8	47.44	1 32.2
21	22 3 22.59	7.550	13 1 59.4	42.15	2 2.6	21	23 34 3.00	7.117	3 37 42.7	47.49	1 31.1
22	22 6 23.61	7.534	12 45 4.3	42.45	2 1.7	22	23 36 53.69	7.107	3 18 42.6	47.54	1 30.0
23	22 9 24.21	7.516	12 28 2.0	42.74	2 0.8	23	23 39 44.16	7.097	2 59 41.8	47.55	1 28.9
24	22 12 24.38	7.498	12 10 52.8	43.02	1 59.8	24	23 42 34.42	7.090	2 40 40.4	47.57	1 27.8
25	22 15 24.12	7.480	11 53 36.9	43.30	1 58.9	25	23 45 24.48	7.082	2 21 38.6	47.59	1 26.7
26	22 18 23.45	7.460	11 36 14.5	43.57	1 57.9	26	23 48 14.35	7.074	2 2 36.5	47.59	1 25.6
27	22 21 22.37	7.440	11 18 45.9	43.83	1 57.0	27	23 51 4.04	7.067	1 43 34.4	47.59	1 24.4
28	22 24 20.90	7.420	11 1 11.1	44.07	1 56.0	28	23 53 53.57	7.060	1 24 32.4	47.59	1 23.3
29	22 27 19.03	7.414	10 43 30.5	44.31	1 55.0	29	23 56 42.94	7.054	1 5 30.7	47.57	1 22.2
30	22 30 16.77	7.398	10 25 44.2	44.55	1 54.0	30	23 59 32.15	7.048	0 46 29.4	47.54	1 21.1
31	22 33 14.14	7.380	10 7 52.4	44.77	1 53.1	31	0 2 21.23	7.042	0 27 28.8	47.51	1 20.0
32	22 36 11.14	+7.367	9 49 55.2	+44.96	1 52.1	0	0 5 10.17	+7.037	-0 8 29.1	+47.47	1 18.8

NOTE.—North declinations are marked +, south declinations —.

## GREENWICH MEAN TIME.

MARCH.						APRIL.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
1	23 59 32.15	+7.048	-0 46 20.4	+47.54	1 21.1	1	1 26 25.02	+7.015	+8 43 0.4	+43.90	0 45.8
2	0 2 21.23	7.042	0 27 28.8	47.51	1 20.0	2	1 29 13.44	7.019	9 0 14.1	42.95	0 44.6
3	0 5 10.17	7.037	-0 8 29.1	47.47	1 18.8	3	1 32 1.95	7.023	9 17 21.8	42.70	0 43.5
4	0 7 58.99	7.032	+0 10 29.6	47.43	1 17.7	4	1 34 50.56	7.028	9 34 23.5	42.44	0 42.4
5	0 10 47.70	7.027	0 29 27.2	47.37	1 16.6	5	1 37 39.28	7.032	9 51 19.0	42.18	0 41.2
6	0 13 36.30	7.023	0 48 23.4	47.31	1 15.4	6	1 40 28.12	7.037	10 8 8.0	41.91	0 40.1
7	0 16 24.80	7.019	1 7 18.0	47.24	1 14.3	7	1 43 17.07	7.042	10 24 50.4	41.63	0 39.0
8	0 19 13.20	7.015	1 26 10.9	47.17	1 13.2	8	1 46 6.15	7.047	10 41 26.1	41.35	0 37.9
9	0 22 1.52	7.011	1 45 1.9	47.08	1 12.0	9	1 48 55.35	7.053	10 57 54.9	41.06	0 36.8
10	0 24 49.76	7.008	2 3 50.7	46.99	1 10.9	10	1 51 44.68	7.058	11 14 16.7	40.76	0 35.6
11	0 27 37.92	7.005	2 22 37.3	46.89	1 9.8	11	1 54 34.14	7.064	11 30 31.4	40.46	0 34.5
12	0 30 26.02	7.002	2 41 21.4	46.79	1 8.6	12	1 57 23.73	7.069	11 46 38.7	40.15	0 33.4
13	0 33 14.05	7.000	3 0 2.9	46.67	1 7.5	13	2 0 13.45	7.075	12 2 38.6	39.84	0 32.3
14	0 36 2.03	6.998	3 18 41.5	46.55	1 6.3	14	2 3 3.32	7.081	12 18 30.8	39.52	0 31.2
15	0 38 49.96	6.996	3 37 17.0	46.42	1 5.2	15	2 5 53.33	7.087	12 34 15.3	39.19	0 30.1
16	0 41 37.85	6.995	3 55 49.4	46.29	1 4.1	16	2 8 43.49	7.093	12 49 51.8	38.86	0 29.0
17	0 44 25.71	6.994	4 14 18.5	46.14	1 2.9	17	2 11 33.80	7.099	13 5 20.3	38.52	0 27.9
18	0 47 13.55	6.993	4 32 44.0	45.99	1 1.8	18	2 14 24.26	7.106	13 20 40.6	38.18	0 26.8
19	0 50 1.37	6.992	4 51 5.7	45.83	1 0.6	19	2 17 14.89	7.113	13 35 52.7	37.83	0 25.7
20	0 52 49.18	6.992	5 9 23.6	45.67	0 59.5	20	2 20 5.68	7.120	13 50 56.3	37.48	0 24.6
21	0 55 36.98	6.992	5 27 37.5	45.50	0 58.3	21	2 22 56.64	7.127	14 5 51.4	37.12	0 23.5
22	0 58 24.79	6.992	5 45 47.2	45.32	0 57.2	22	2 25 47.77	7.134	14 20 37.8	36.76	0 22.4
23	1 1 12.61	6.993	6 3 52.6	45.13	0 56.0	23	2 28 39.07	7.141	14 35 15.5	36.39	0 21.3
24	1 4 0.45	6.994	6 21 53.4	44.94	0 54.9	24	2 31 30.55	7.148	14 49 44.3	36.02	0 20.2
25	1 6 48.33	6.995	6 39 49.6	44.74	0 53.8	25	2 34 22.21	7.156	15 4 4.1	35.64	0 19.1
26	1 9 36.25	6.997	6 57 41.0	44.54	0 52.6	26	2 37 14.06	7.164	15 18 14.8	35.26	0 18.1
27	1 12 24.21	6.999	7 15 27.4	44.33	0 51.5	27	2 40 6.10	7.172	15 32 16.3	34.87	0 17.0
28	1 15 12.23	7.002	7 33 8.7	44.12	0 50.3	28	2 42 58.34	7.181	15 46 8.5	34.48	0 15.9
29	1 18 0.31	7.005	7 50 44.8	43.90	0 49.2	29	2 45 50.77	7.189	15 59 51.2	34.08	0 14.8
30	1 20 48.47	7.008	8 8 15.6	43.67	0 48.1	30	2 48 43.40	7.197	16 13 24.4	33.68	0 13.8
31	1 23 36.70	7.011	8 25 40.8	43.44	0 46.9	31	2 51 36.23	7.205	16 26 47.9	33.26	0 12.7
32	1 26 25.02	+7.015	+8 43 0.4	+43.20	0 45.8	32	2 54 29.25	+7.213	+16 40 1.6	+32.87	0 11.7
Day of the Month,						Day of the Month,					
		5th.	13th.	21st.	29th.			6th.	14th.	22d.	30th.
Semidiameter		2.2	2.2	2.1	2.1	Semidiameter		2.1	2.1	2.1	2.0
Horizontal Parallax		3.8	3.8	3.7	3.7	Horizontal Parallax		3.7	3.6	3.6	3.6

+ prefixed to the hourly change of declination, indicates that north declinations are increasing, and south declinations are decreasing; — indicates that north declinations are decreasing, south declinations increasing.



GREENWICH MEAN TIME.										
MAY.						JUNE.				
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.
	<small>h m s</small>	<small>s</small>	<small>° ' "</small>	<small>"</small>	<small>h m</small>		<small>h m s</small>	<small>s</small>	<small>° ' "</small>	<small>"</small>
1	2 51 36.23	+7.905	+16 26 47.9	+33.28	0 12.7	1	4 22 22.89	+7.418	+21 52 40.8	+18.74
2	2 54 29.25	7.913	16 40 1.6	32.87	0 11.7	2	4 25 20.97	7.422	22 0 4.2	18.32
3	2 57 22.47	7.922	16 53 5.4	32.45	0 10.6	3	4 28 19.14	7.426	22 7 15.3	17.70
4	3 0 15.89	7.930	17 5 59.3	32.03	0 9.6	4	4 31 17.41	7.430	22 14 13.9	17.18
5	3 3 9.51	7.938	17 18 43.1	31.61	0 8.5	5	4 34 15.77	7.433	22 20 59.9	16.66
6	3 6 3.33	7.947	17 31 16.6	31.18	0 7.5	6	4 37 14.21	7.436	22 27 33.4	16.13
7	3 8 57.34	7.955	17 43 39.8	30.75	0 6.4	7	4 40 12.71	7.439	22 33 54.3	15.61
8	3 11 51.55	7.963	17 55 52.5	30.31	0 5.4	8	4 43 11.26	7.441	22 40 2.6	15.08
9	3 14 45.94	7.970	18 7 54.6	29.87	0 4.3	9	4 46 9.86	7.443	22 45 58.2	14.55
10	3 17 40.52	7.978	18 19 46.1	29.42	0 3.3	10	4 49 8.50	7.444	22 51 41.2	14.02
11	3 20 35.28	7.985	18 31 26.8	28.97	0 2.3	11	4 52 7.18	7.445	22 57 11.4	13.49
12	3 23 30.22	7.993	18 42 56.6	28.51	0 1.3	12	4 55 5.88	7.446	23 2 28.8	12.96
13	3 26 25.33	7.300	18 54 15.4	28.05	0 0.2	13	4 58 4.60	7.447	23 7 33.4	12.43
14	3 29 20.62	7.306	19 5 23.1	27.59	23 59.2	14	5 1 3.32	7.447	23 12 25.2	11.89
15	3 32 16.09	7.315	19 16 19.7	27.13	23 57.2	15	5 4 2.04	7.447	23 17 4.2	11.36
16	3 35 11.73	7.322	19 27 5.1	26.66	23 56.2	16	5 7 0.75	7.446	23 21 30.4	10.82
17	3 38 7.53	7.329	19 37 39.1	26.18	23 55.2	17	5 9 59.44	7.445	23 25 43.7	10.29
18	3 41 3.50	7.336	19 48 1.7	25.70	23 54.2	18	5 12 58.11	7.444	23 29 44.3	9.76
19	3 43 59.63	7.342	19 58 12.7	25.22	23 53.1	19	5 15 56.74	7.443	23 33 32.1	9.23
20	3 46 55.92	7.349	20 8 12.2	24.74	23 52.1	20	5 18 55.33	7.441	23 37 7.1	8.69
21	3 49 52.37	7.355	20 18 0.1	24.25	23 51.1	21	5 21 53.88	7.439	23 40 29.2	8.15
22	3 52 48.97	7.362	20 27 36.3	23.76	23 50.2	22	5 24 52.38	7.436	23 43 38.2	7.61
23	3 55 45.73	7.368	20 37 0.7	23.27	23 49.2	23	5 27 50.82	7.434	23 46 34.4	7.08
24	3 58 42.63	7.374	20 46 13.3	22.78	23 48.2	24	5 30 49.20	7.431	23 49 17.8	6.55
25	4 1 39.68	7.380	20 55 14.0	22.28	23 47.2	25	5 33 47.50	7.428	23 51 48.6	6.02
26	4 4 36.88	7.386	21 4 2.7	21.78	23 46.2	26	5 36 45.72	7.424	23 54 6.7	5.49
27	4 7 34.23	7.392	21 12 39.4	21.28	23 45.2	27	5 39 43.85	7.420	23 56 12.0	4.95
28	4 10 31.71	7.398	21 21 4.1	20.78	23 44.2	28	5 42 41.88	7.416	23 58 4.5	4.42
29	4 13 29.32	7.403	21 29 16.6	20.27	23 43.2	29	5 45 39.80	7.411	23 59 44.2	3.89
30	4 16 27.06	7.408	21 37 16.9	19.76	23 42.3	30	5 48 37.61	7.406	24 1 11.3	3.37
31	4 19 24.92	7.413	21 45 5.0	19.25	23 41.3	31	5 51 35.29	7.401	24 2 25.8	2.84
32	4 22 22.89	+7.418	+21 52 40.8	+18.74	23 40.3	32	5 54 32.84	+7.395	+24 3 27.6	+2.31
Day of the Month,						Day of the Month,				
		8th.	16th.	24th.	32d.			1st.	9th.	17th.
Semidiameter		2.0	2.0	2.0	2.0	Semidiameter		2.0	2.0	2.0
Horizontal Parallax		3.6	3.5	3.5	3.5	Horizontal Parallax		3.5	3.5	3.5

NOTE.—North declinations are marked +, south declinations —.

## GREENWICH MEAN TIME.

JULY.						AUGUST.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m
1	5 51 35.29	+7.401	+24 2 25.6	+2.84	23 11.3	1	7 21 30.45	+7.055	+23 0 18.6	-12.42	22 38.8
2	5 54 32.84	7.395	24 3 27.6	2.31	23 10.3	2	7 24 19.58	7.039	22 55 15.3	12.86	22 37.7
3	5 57 30.24	7.389	24 4 16.8	1.78	23 9.3	3	7 27 8.32	7.023	22 50 1.5	13.29	22 36.6
4	6 0 27.48	7.382	24 4 53.3	1.26	23 8.3	4	7 29 56.68	7.007	22 44 37.3	13.73	22 35.4
5	6 3 24.55	7.375	24 5 17.2	0.74	23 7.3	5	7 32 44.65	6.991	22 39 2.7	14.16	22 34.3
6	6 6 21.45	7.367	24 5 28.7	+0.22	23 6.3	6	7 35 32.23	6.974	22 33 17.8	14.58	22 33.1
7	6 9 18.16	7.359	24 5 27.7	-0.30	23 5.3	7	7 38 19.41	6.957	22 27 22.9	15.00	22 32.0
8	6 12 14.66	7.350	24 5 14.3	0.82	23 4.3	8	7 41 6.17	6.940	22 21 17.9	15.42	22 30.8
9	6 15 10.95	7.341	24 4 48.5	1.34	23 3.3	9	7 43 52.51	6.922	22 15 3.0	15.83	22 29.6
10	6 18 7.02	7.332	24 4 10.3	1.85	23 2.3	10	7 46 38.44	6.905	22 8 38.2	16.24	22 28.4
11	6 21 2.87	7.322	24 3 19.8	2.36	23 1.3	11	7 49 23.95	6.887	22 2 3.7	16.64	22 27.3
12	6 23 58.48	7.312	24 2 17.1	2.87	23 0.2	12	7 52 9.03	6.870	21 55 19.6	17.04	22 26.1
13	6 26 53.84	7.302	24 1 2.2	3.38	22 59.2	13	7 54 53.69	6.852	21 48 26.0	17.43	22 24.9
14	6 29 48.95	7.291	23 59 35.2	3.88	22 58.2	14	7 57 37.92	6.834	21 41 23.1	17.82	22 23.6
15	6 32 43.79	7.280	23 57 56.1	4.38	22 57.2	15	8 0 21.73	6.816	21 34 10.8	18.20	22 22.4
16	6 35 38.36	7.269	23 56 5.1	4.87	22 56.1	16	8 3 5.10	6.798	21 26 49.4	18.58	22 21.2
17	6 38 32.66	7.257	23 54 2.2	5.37	22 55.1	17	8 5 48.04	6.780	21 19 18.9	18.96	22 20.0
18	6 41 26.68	7.245	23 51 47.4	5.86	22 54.0	18	8 8 30.54	6.762	21 11 39.4	19.33	22 18.7
19	6 44 20.41	7.233	23 49 20.9	6.35	22 53.0	19	8 11 12.61	6.744	21 3 51.0	19.70	22 17.5
20	6 47 13.86	7.221	23 46 42.6	6.84	22 51.9	20	8 13 54.25	6.726	20 55 53.9	20.06	22 16.2
21	6 50 7.01	7.209	23 43 52.7	7.32	22 50.9	21	8 16 35.46	6.708	20 47 48.1	20.42	22 15.0
22	6 52 59.86	7.196	23 40 51.3	7.80	22 49.8	22	8 19 16.23	6.690	20 39 33.8	20.77	22 13.7
23	6 55 52.40	7.183	23 37 38.4	8.28	22 48.7	23	8 21 56.57	6.672	20 31 11.1	21.12	22 12.4
24	6 58 44.63	7.170	23 34 14.1	8.75	22 47.7	24	8 24 36.47	6.653	20 22 40.0	21.47	22 11.1
25	7 1 36.55	7.157	23 30 38.4	9.22	22 46.6	25	8 27 15.94	6.635	20 14 0.7	21.81	22 9.9
26	7 4 28.14	7.143	23 26 51.5	9.69	22 45.5	26	8 29 54.97	6.617	20 5 13.3	22.14	22 8.6
27	7 7 19.39	7.129	23 22 53.4	10.15	22 44.4	27	8 32 33.57	6.599	19 56 17.9	22.47	22 7.2
28	7 10 10.30	7.114	23 18 44.2	10.61	22 43.3	28	8 35 11.73	6.581	19 47 14.6	22.80	22 5.9
29	7 13 0.87	7.100	23 14 24.1	11.07	22 42.2	29	8 37 49.45	6.562	19 38 3.6	23.12	22 4.6
30	7 15 51.09	7.085	23 9 53.1	11.52	22 41.1	30	8 40 26.72	6.544	19 28 44.9	23.44	22 3.3
31	7 18 40.95	7.070	23 5 11.2	11.97	22 40.0	31	8 43 3.55	6.525	19 19 18.7	23.75	22 2.0
32	7 21 30.45	+7.055	+23 0 18.6	-12.42	22 38.8	32	8 45 39.93	+6.507	+19 9 45.0	-24.06	22 0.6
Day of the Month,						Day of the Month,					
Semidiameter						Semidiameter					
Horizontal Parallax						Horizontal Parallax					
2d.						4th.					
11th.						12th.					
19th.						20th.					
27th.						28th.					
2.0						2.0					
3.5						3.6					
2.0						2.0					
3.5						3.6					
2.0						2.1					
3.5						3.6					

+ prefixed to the hourly change of declination, indicates that north declinations are increasing, and south declinations are decreasing; — indicates that north declinations are decreasing, south declinations increasing.

## GREENWICH MEAN TIME.

SEPTEMBER.						OCTOBER.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m
1	8 45 39.93	+6.507	+19 9 45.0	-24.06	22 0.6	1	10 0 27.31	+5.979	+13 35 15.2	-30.99	21 17.0
2	8 48 15.87	6.488	19 0 4.0	24.36	21 59.3	2	10 2 50.46	5.956	13 22 49.6	31.15	21 15.4
3	8 50 51.35	6.469	18 50 15.9	24.65	21 57.9	3	10 5 13.21	5.940	13 10 20.2	31.30	21 13.8
4	8 53 26.38	6.450	18 40 20.9	24.94	21 56.5	4	10 7 35.57	5.924	12 57 47.3	31.45	21 12.3
5	8 56 0.95	6.431	18 30 18.9	25.23	21 55.2	5	10 9 57.54	5.907	12 45 10.9	31.59	21 10.7
6	8 58 35.08	6.412	18 20 10.1	25.51	21 53.8	6	10 12 19.11	5.891	12 32 31.1	31.73	21 9.1
7	9 1 8.75	6.394	18 9 54.6	25.79	21 52.4	7	10 14 40.30	5.875	12 19 48.1	31.86	21 7.5
8	9 3 41.97	6.375	17 59 32.5	26.06	21 51.0	8	10 17 1.10	5.859	12 7 2.0	31.99	21 5.9
9	9 6 14.73	6.356	17 49 4.0	26.32	21 49.6	9	10 19 21.52	5.843	11 54 12.9	32.11	21 4.3
10	9 8 47.05	6.337	17 38 29.3	26.58	21 48.2	10	10 21 41.56	5.827	11 41 20.9	32.23	21 2.7
11	9 11 18.92	6.318	17 27 48.3	26.84	21 46.8	11	10 24 1.23	5.811	11 28 26.0	32.34	21 1.1
12	9 13 50.34	6.300	17 17 1.2	27.09	21 45.4	12	10 26 20.53	5.796	11 15 28.4	32.45	20 59.5
13	9 16 21.33	6.282	17 6 8.1	27.34	21 43.9	13	10 28 39.46	5.781	11 2 28.3	32.56	20 57.8
14	9 18 51.88	6.264	16 55 9.1	27.58	21 42.5	14	10 30 58.04	5.767	10 49 25.8	32.66	20 56.2
15	9 21 22.00	6.246	16 44 4.4	27.82	21 41.0	15	10 33 16.26	5.752	10 36 20.8	32.76	20 54.5
16	9 23 51.69	6.228	16 32 54.1	28.05	21 39.6	16	10 35 34.14	5.738	10 23 13.5	32.85	20 52.9
17	9 26 20.95	6.210	16 21 38.2	28.28	21 38.1	17	10 37 51.67	5.723	10 10 3.9	32.94	20 51.2
18	9 28 49.79	6.193	16 10 16.9	28.50	21 36.7	18	10 40 8.86	5.709	9 56 52.3	33.03	20 49.6
19	9 31 18.20	6.175	15 58 50.2	28.72	21 35.2	19	10 42 25.72	5.695	9 43 38.6	33.11	20 47.9
20	9 33 46.20	6.158	15 47 18.3	28.94	21 33.7	20	10 44 42.23	5.681	9 30 23.0	33.19	20 46.2
21	9 36 13.79	6.141	15 35 41.3	29.15	21 32.2	21	10 46 58.42	5.667	9 17 5.5	33.26	20 44.6
22	9 38 40.97	6.124	15 23 59.4	29.35	21 30.7	22	10 49 14.29	5.654	9 3 46.4	33.33	20 42.9
23	9 41 7.74	6.107	15 12 12.6	29.55	21 29.2	23	10 51 29.83	5.640	8 50 25.6	33.40	20 41.2
24	9 43 34.09	6.090	15 0 20.9	29.75	21 27.7	24	10 53 45.05	5.627	8 37 3.3	33.46	20 39.5
25	9 46 0.04	6.073	14 48 24.6	29.94	21 26.2	25	10 55 59.94	5.613	8 23 39.6	33.51	20 37.8
26	9 48 25.59	6.056	14 36 23.7	30.13	21 24.7	26	10 58 14.51	5.600	8 10 14.7	33.56	20 36.1
27	9 50 50.73	6.040	14 24 18.4	30.31	21 23.2	27	11 0 28.75	5.587	7 56 48.6	33.61	20 34.4
28	9 53 15.47	6.023	14 12 8.7	30.49	21 21.6	28	11 2 42.67	5.574	7 43 21.5	33.65	20 32.7
29	9 55 39.82	6.006	13 59 54.9	30.66	21 20.1	29	11 4 56.28	5.561	7 29 53.5	33.69	20 31.0
30	9 58 3.76	5.989	13 47 37.0	30.83	21 18.5	30	11 7 9.58	5.547	7 16 24.6	33.72	20 29.3
31	10 0 27.31	5.972	13 35 15.2	30.99	21 17.0	31	11 9 22.55	5.533	7 2 55.0	33.75	20 27.5
32	10 2 50.46	+5.956	+13 22 49.6	-31.15	21 15.4	32	11 11 35.20	+5.520	+6 49 24.8	-33.77	20 25.8
Day of the Month,						Day of the Month,					
		5th.	13th.	21st.	29th.			7th.	15th.	23d.	31st.
Semidiameter		2.1	2.1	2.2	2.2	Semidiameter		2.3	2.3	2.4	2.5
Horizontal Parallax		3.7	3.8	3.8	3.9	Horizontal Parallax		4.0	4.1	4.2	4.3

NOTE.—North declinations are marked +, south declinations —.

## GREENWICH MEAN TIME.

NOVEMBER.						DECEMBER.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	"	° ' "	"	h m		h m s	"	° ' "	"	h m
1	11 11 35.20	+5.520	+ 6 49 24.8	-33.77	20 25.8	1	12 15 36.65	+5.155	+ 0 7 58.4	-32.54	19 31.5
2	11 13 47.53	5.507	6 35 54.2	33.79	20 24.0	2	12 17 40.22	5.142	0 5 1.3	32.43	19 29.6
3	11 15 59.54	5.494	6 22 23.2	33.80	20 22.3	3	12 19 43.48	5.129	0 17 58.3	32.33	19 27.7
4	11 18 11.24	5.481	6 8 52.0	33.81	20 20.6	4	12 21 46.43	5.117	0 30 52.5	32.21	19 25.8
5	11 20 22.63	5.468	5 55 20.6	33.81	20 18.8	5	12 23 49.08	5.104	0 43 44.0	32.09	19 23.9
6	11 22 33.71	5.456	5 41 49.2	33.81	20 17.0	6	12 25 51.42	5.091	0 56 32.6	31.97	19 22.0
7	11 24 44.49	5.443	5 28 17.9	33.80	20 15.3	7	12 27 53.46	5.078	1 9 18.3	31.84	19 20.1
8	11 26 54.96	5.430	5 14 46.7	33.80	20 13.5	8	12 29 55.18	5.065	1 22 0.9	31.71	19 18.2
9	11 29 5.12	5.417	5 1 15.7	33.79	20 11.7	9	12 31 56.59	5.052	1 34 40.4	31.58	19 16.3
10	11 31 14.99	5.405	4 47 45.1	33.77	20 10.0	10	12 33 57.69	5.039	1 47 16.8	31.45	19 14.3
11	11 33 24.56	5.393	4 34 14.9	33.75	20 8.2	11	12 35 58.47	5.026	1 59 49.8	31.31	19 12.4
12	11 35 33.84	5.381	4 20 45.2	33.73	20 6.4	12	12 37 58.93	5.013	2 12 19.5	31.17	19 10.5
13	11 37 42.84	5.369	4 7 16.1	33.70	20 4.6	13	12 39 59.07	4.999	2 24 45.8	31.03	19 8.5
14	11 39 51.55	5.357	3 53 47.6	33.67	20 2.8	14	12 41 58.90	4.986	2 37 8.6	30.88	19 6.6
15	11 41 59.98	5.345	3 40 19.9	33.64	20 1.0	15	12 43 58.41	4.973	2 49 27.9	30.73	19 4.6
16	11 44 8.13	5.334	3 26 53.1	33.60	19 59.2	16	12 45 57.59	4.960	3 1 43.5	30.58	19 2.7
17	11 46 16.00	5.322	3 13 27.1	33.56	19 57.4	17	12 47 56.45	4.946	3 13 55.4	30.42	19 0.7
18	11 48 23.50	5.311	3 0 2.2	33.52	19 55.5	18	12 49 54.97	4.932	3 26 3.4	30.26	18 58.7
19	11 50 30.90	5.299	2 46 38.4	33.47	19 53.7	19	12 51 53.14	4.917	3 38 7.6	30.09	18 56.8
20	11 52 37.94	5.288	2 33 15.9	33.42	19 51.9	20	12 53 50.97	4.902	3 50 7.8	29.92	18 54.8
21	11 54 44.70	5.276	2 19 54.7	33.36	19 50.1	21	12 55 48.45	4.887	4 2 3.9	29.75	18 52.8
22	11 56 51.18	5.265	2 6 34.9	33.30	19 48.2	22	12 57 45.56	4.872	4 13 55.8	29.57	18 50.8
23	11 58 57.39	5.253	1 53 16.5	33.23	19 46.4	23	12 59 42.30	4.856	4 25 43.4	29.39	18 48.8
24	12 1 3.31	5.241	1 39 59.8	33.16	19 44.5	24	13 1 38.66	4.840	4 37 26.5	29.21	18 46.8
25	12 3 8.95	5.229	1 26 44.9	33.09	19 42.7	25	13 3 34.63	4.824	4 49 5.2	29.02	18 44.8
26	12 5 14.30	5.217	1 13 31.8	33.01	19 40.8	26	13 5 30.19	4.807	5 0 39.2	28.82	18 42.8
27	12 7 19.37	5.205	1 0 20.7	32.92	19 39.0	27	13 7 25.34	4.789	5 12 8.5	28.62	18 40.7
28	12 9 24.14	5.193	0 47 11.7	32.83	19 37.1	28	13 9 20.07	4.772	5 23 32.9	28.42	18 38.7
29	12 11 28.61	5.180	0 34 5.0	32.74	19 35.2	29	13 11 14.38	4.754	5 34 52.5	28.21	18 36.7
30	12 13 32.78	5.168	0 21 0.5	32.64	19 33.4	30	13 13 8.25	4.735	5 46 7.1	28.00	18 34.6
31	12 15 36.65	5.155	+ 0 7 58.4	32.54	19 31.5	31	13 15 1.66	4.716	5 57 16.6	27.79	18 32.6
32	12 17 40.22	+5.142	- 0 5 1.3	-32.43	19 29.6	32	13 16 54.62	+4.697	- 6 8 21.0	-27.57	18 30.5
Day of the Month,						Day of the Month,					
8th.						2d.					
16th.						10th.					
24th.						18th.					
32d.						26th.					
Semidiameter						2d.					
Horizantal Parallax						2.9					
2.5						5.2					
2.6						3.1					
2.7						5.4					
2.8						3.2					
4.4						5.7					
4.6						3.4					
4.8						6.0					
4.9											

+ prefixed to the hourly change of declination, indicates that north declinations are increasing, and south declinations are decreasing; - indicates that north declinations are decreasing, south declinations increasing.

## GREENWICH MEAN TIME.

JANUARY.						FEBRUARY.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>o</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>	<sup>h</sup> <sup>m</sup>		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>o</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>	<sup>h</sup> <sup>m</sup>
1	7 55 26.61	-1.307	+21 13 11.9	+3.99	13 11.2	1	7 38 22.42	-1.377	+22 0 35.2	+3.23	10 52.3
2	7 54 55.05	1.322	21 14 47.8	4.01	13 6.7	2	7 37 51.98	1.980	22 1 51.9	3.17	10 47.9
3	7 54 23.17	1.335	21 16 24.1	4.03	13 2.2	3	7 37 21.96	1.941	22 3 7.1	3.10	10 43.4
4	7 53 50.96	1.348	21 18 0.8	4.03	12 57.8	4	7 36 52.39	1.922	22 4 20.8	3.04	10 39.0
5	7 53 18.44	1.361	21 19 37.7	4.04	12 53.3	5	7 36 23.29	1.909	22 5 32.9	2.98	10 34.6
6	7 52 45.64	1.372	21 21 14.8	4.05	12 48.8	6	7 35 54.67	1.882	22 6 43.5	2.91	10 30.2
7	7 52 12.60	1.382	21 22 52.0	4.05	12 44.3	7	7 35 26.56	1.860	22 7 52.5	2.84	10 25.8
8	7 51 39.34	1.390	21 24 29.2	4.05	12 39.9	8	7 34 58.99	1.837	22 8 59.8	2.77	10 21.4
9	7 51 5.89	1.397	21 26 6.4	4.05	12 35.4	9	7 34 31.98	1.814	22 10 5.4	2.70	10 17.0
10	7 50 32.26	1.404	21 27 43.6	4.05	12 30.9	10	7 34 5.54	1.090	22 11 9.4	2.63	10 12.7
11	7 49 58.48	1.410	21 29 20.7	4.04	12 26.4	11	7 33 39.68	1.065	22 12 11.7	2.56	10 8.3
12	7 49 24.58	1.414	21 30 57.4	4.03	12 21.9	12	7 33 14.44	1.039	22 13 12.2	2.49	10 4.0
13	7 48 50.60	1.417	21 32 33.9	4.01	12 17.4	13	7 32 49.83	1.012	22 14 11.0	2.41	9 59.7
14	7 48 16.56	1.419	21 34 9.9	3.99	12 12.9	14	7 32 25.85	0.985	22 15 8.0	2.34	9 55.4
15	7 47 42.48	1.420	21 35 45.4	3.97	12 8.4	15	7 32 2.52	0.958	22 16 3.2	2.26	9 51.1
16	7 47 8.40	1.420	21 37 20.4	3.95	12 3.9	16	7 31 39.87	0.930	22 16 56.6	2.19	9 46.8
17	7 46 34.33	1.419	21 38 54.8	3.92	11 59.4	17	7 31 17.90	0.901	22 17 48.2	2.11	9 42.5
18	7 46 0.30	1.416	21 40 28.4	3.89	11 54.9	18	7 30 56.62	0.872	22 18 38.0	2.04	9 38.2
19	7 45 26.34	1.413	21 42 1.4	3.86	11 50.4	19	7 30 36.05	0.842	22 19 26.0	1.96	9 33.9
20	7 44 52.47	1.409	21 43 33.6	3.82	11 45.9	20	7 30 16.20	0.812	22 20 12.2	1.89	9 29.6
21	7 44 18.73	1.403	21 45 4.9	3.78	11 41.4	21	7 29 57.08	0.781	22 20 56.6	1.81	9 25.4
22	7 43 45.14	1.396	21 46 35.2	3.74	11 36.9	22	7 29 38.70	0.750	22 21 39.1	1.74	9 21.2
23	7 43 11.72	1.389	21 48 4.5	3.70	11 32.4	23	7 29 21.07	0.719	22 22 19.8	1.66	9 17.0
24	7 42 38.49	1.380	21 49 32.7	3.66	11 28.0	24	7 29 4.19	0.687	22 22 58.7	1.59	9 12.8
25	7 42 5.47	1.371	21 50 59.8	3.61	11 23.5	25	7 28 48.08	0.655	22 23 35.7	1.51	9 8.6
26	7 41 32.69	1.360	21 52 25.8	3.56	11 19.0	26	7 28 32.75	0.623	22 24 10.9	1.43	9 4.4
27	7 41 0.18	1.348	21 53 50.6	3.51	11 14.5	27	7 28 18.19	0.590	22 24 44.2	1.35	9 0.2
28	7 40 27.97	1.336	21 55 14.1	3.46	11 10.1	28	7 28 4.41	0.556	22 25 15.7	1.28	8 56.0
29	7 39 56.06	1.323	21 56 36.4	3.41	11 5.6	29	7 27 51.42	0.524	22 25 45.4	1.20	8 51.9
30	7 39 24.48	1.309	21 57 57.4	3.35	11 1.1	30	7 27 39.24	0.491	22 26 13.2	1.13	8 47.8
31	7 38 53.26	1.294	21 59 17.0	3.29	10 56.7	31	7 27 27.87	0.458	22 26 39.2	1.05	8 43.7
32	7 38 22.42	-1.377	+22 0 35.2	+3.23	10 52.3	32	7 27 17.31	-0.424	+22 27 3.4	+0.98	8 39.6
Day of the Month,      1st.      11th.      21st.      31st.						Day of the Month,      1st.      11th.      21st.      31st.					
Polar Semidiameter      22'.0						Polar Semidiameter      21'.8					
Horizontal Parallax      2.1						Horizontal Parallax      2.1					

NOTE.—North declinations are marked +, south declinations —. + prefixed to the hourly change of declination, indicates that south declinations

## GREENWICH MEAN TIME.

MARCH.						APRIL.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m
1	7 27 39.24	-0.491	+22 26 13.2	+1.13	8 47.8	1	7 28 10.66	+0.502	+22 25 50.8	-1.15	6 46.6
2	7 27 27.87	0.458	22 26 39.2	1.05	8 43.7	2	7 28 24.55	0.504	22 25 22.4	1.22	6 42.9
3	7 27 17.31	0.424	22 27 3.4	0.98	8 39.6	3	7 28 39.19	0.626	22 24 52.3	1.29	6 39.2
4	7 27 7.56	0.389	22 27 25.8	0.90	8 35.5	4	7 28 54.58	0.657	22 24 20.5	1.36	6 35.5
5	7 26 58.63	0.355	22 27 46.4	0.82	8 31.4	5	7 29 10.72	0.688	22 23 47.0	1.43	6 31.8
6	7 26 50.53	0.320	22 28 5.2	0.74	8 27.3	6	7 29 27.60	0.719	22 23 11.9	1.50	6 28.2
7	7 26 43.26	0.286	22 28 22.1	0.67	8 23.2	7	7 29 45.21	0.749	22 22 35.1	1.57	6 24.5
8	7 26 36.82	0.251	22 28 37.2	0.59	8 19.2	8	7 30 3.55	0.779	22 21 56.6	1.64	6 20.9
9	7 26 31.22	0.216	22 28 50.5	0.52	8 15.2	9	7 30 22.62	0.809	22 21 16.3	1.71	6 17.3
10	7 26 26.46	0.181	22 29 2.0	0.44	8 11.2	10	7 30 42.40	0.839	22 20 34.3	1.78	6 13.7
11	7 26 22.54	0.146	22 29 11.7	0.37	8 7.2	11	7 31 2.88	0.868	22 19 50.7	1.85	6 10.1
12	7 26 19.46	0.111	22 29 19.7	0.30	8 3.2	12	7 31 24.06	0.897	22 19 5.4	1.92	6 6.5
13	7 26 17.22	0.076	22 29 25.9	0.23	7 59.3	13	7 31 45.93	0.925	22 18 18.4	1.99	6 2.9
14	7 26 15.82	0.041	22 29 30.3	0.15	7 55.3	14	7 32 8.48	0.953	22 17 29.8	2.06	5 59.4
15	7 26 15.26	-0.006	22 29 32.9	+0.08	7 51.4	15	7 32 31.70	0.981	22 16 39.5	2.13	5 55.8
16	7 26 15.54	+0.029	22 29 33.7	0.00	7 47.4	16	7 32 55.59	1.009	22 15 47.5	2.20	5 52.2
17	7 26 16.66	0.064	22 29 32.7	-0.08	7 43.5	17	7 33 20.13	1.036	22 14 53.8	2.27	5 48.7
18	7 26 18.61	0.098	22 29 30.0	0.15	7 39.6	18	7 33 45.31	1.063	22 13 58.4	2.34	5 45.2
19	7 26 21.38	0.133	22 29 25.6	0.23	7 35.7	19	7 34 11.13	1.089	22 13 1.4	2.41	5 41.7
20	7 26 24.97	0.167	22 29 19.4	0.30	7 31.8	20	7 34 37.58	1.115	22 12 2.7	2.48	5 38.2
21	7 26 29.38	0.201	22 29 11.4	0.37	7 28.0	21	7 35 4.65	1.141	22 11 2.3	2.55	5 34.7
22	7 26 34.61	0.235	22 29 1.7	0.44	7 24.1	22	7 35 32.33	1.168	22 10 0.2	2.62	5 31.3
23	7 26 40.65	0.269	22 28 50.3	0.51	7 20.3	23	7 36 0.61	1.191	22 8 56.5	2.69	5 27.8
24	7 26 47.50	0.302	22 28 37.2	0.58	7 16.5	24	7 36 29.48	1.216	22 7 51.1	2.76	5 24.4
25	7 26 55.14	0.335	22 28 22.4	0.65	7 12.7	25	7 36 58.95	1.240	22 6 44.0	2.83	5 21.0
26	7 27 3.58	0.368	22 28 5.9	0.72	7 8.9	26	7 37 29.00	1.264	22 5 35.3	2.90	5 17.6
27	7 27 12.81	0.401	22 27 47.7	0.79	7 5.1	27	7 37 59.62	1.287	22 4 24.9	2.97	5 14.2
28	7 27 22.82	0.434	22 27 27.8	0.87	7 1.4	28	7 38 30.80	1.311	22 3 12.8	3.04	5 10.8
29	7 27 33.62	0.468	22 27 6.1	0.94	6 57.7	29	7 39 2.54	1.334	22 1 59.0	3.11	5 7.4
30	7 27 45.19	0.498	22 26 42.7	1.01	6 54.0	30	7 39 34.83	1.357	22 0 43.5	3.18	5 4.0
31	7 27 57.54	0.530	22 26 17.6	1.08	6 50.3	31	7 40 7.67	1.380	21 59 26.4	3.25	5 0.6
32	7 28 10.66	+0.502	+22 25 50.8	-1.15	6 46.6	32	7 40 41.06	+1.402	+21 58 7.6	-3.32	4 57.2
Day of the Month,						Day of the Month,					
		1st.	11th.	21st.	31st.			1st.	11th.	21st.	31st.
Polar Semidiameter		20".6	20".0	19".4	18".8	Polar Semidiameter		18".7	18".1	17".6	17".1
Horizontal Parallax		1.9	1.9	1.8	1.8	Horizontal Parallax		1.8	1.7	1.7	1.6

north declinations are increasing, and south declinations are decreasing; — indicates that north declinations are decreasing, increasing.

## GREENWICH MEAN TIME.

MAY.						JUNE.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m
1	7 40 7.67	+1.380	+21 50 26.4	-3.25	5 0.6	1	8 0 52.93	+1.917	+21 5 38.7	-5.42	3 19.4
2	7 40 41.06	1.402	21 58 7.6	3.32	4 57.2	2	8 1 39.09	1.930	21 3 27.9	5.49	3 16.2
3	7 41 14.97	1.424	21 56 47.1	3.39	4 53.8	3	8 2 25.55	1.942	21 1 15.4	5.56	3 13.0
4	7 41 49.40	1.445	21 55 24.9	3.46	4 50.5	4	8 3 12.30	1.954	20 59 1.3	5.63	3 9.9
5	7 42 24.35	1.467	21 54 0.9	3.53	4 47.1	5	8 3 59.34	1.966	20 56 45.5	5.70	3 6.8
6	7 42 59.81	1.488	21 52 35.2	3.60	4 43.7	6	8 4 46.66	1.977	20 54 28.0	5.77	3 3.6
7	7 43 35.76	1.509	21 51 7.9	3.67	4 40.4	7	8 5 34.25	1.988	20 52 8.9	5.83	3 0.4
8	7 44 12.21	1.529	21 49 39.0	3.75	4 37.1	8	8 6 22.10	1.999	20 49 48.2	5.90	2 57.3
9	7 44 49.14	1.549	21 48 8.4	3.82	4 33.8	9	8 7 10.21	2.010	20 47 25.9	5.97	2 54.2
10	7 45 26.54	1.568	21 46 36.1	3.89	4 30.5	10	8 7 58.58	2.021	20 45 2.0	6.04	2 51.0
11	7 46 4.41	1.587	21 45 2.0	3.96	4 27.2	11	8 8 47.20	2.031	20 42 36.4	6.10	2 47.9
12	7 46 42.73	1.606	21 43 26.2	4.03	4 23.9	12	8 9 36.05	2.040	20 40 9.2	6.16	2 44.8
13	7 47 21.50	1.625	21 41 48.8	4.10	4 20.6	13	8 10 25.12	2.049	20 37 40.5	6.23	2 41.7
14	7 48 0.71	1.643	21 40 9.7	4.17	4 17.3	14	8 11 14.41	2.058	20 35 10.2	6.30	2 38.5
15	7 48 40.35	1.661	21 38 28.9	4.24	4 14.0	15	8 12 3.92	2.067	20 32 38.3	6.36	2 35.4
16	7 49 20.41	1.678	21 36 46.4	4.31	4 10.8	16	8 12 53.64	2.076	20 30 4.9	6.42	2 32.3
17	7 50 0.89	1.695	21 35 2.2	4.38	4 7.5	17	8 13 43.57	2.084	20 27 30.0	6.49	2 29.2
18	7 50 41.78	1.712	21 33 16.3	4.45	4 4.2	18	8 14 33.69	2.092	20 24 53.5	6.55	2 26.1
19	7 51 23.07	1.729	21 31 28.8	4.52	4 0.9	19	8 15 24.00	2.100	20 22 15.5	6.62	2 23.0
20	7 52 4.75	1.745	21 29 39.6	4.59	3 57.7	20	8 16 14.50	2.108	20 19 35.9	6.68	2 19.9
21	7 52 46.82	1.761	21 27 48.7	4.66	3 54.4	21	8 17 5.18	2.116	20 16 54.8	6.75	2 16.8
22	7 53 29.26	1.776	21 25 56.1	4.73	3 51.2	22	8 17 56.04	2.123	20 14 12.2	6.81	2 13.7
23	7 54 12.07	1.791	21 24 1.9	4.80	3 48.0	23	8 18 47.07	2.130	20 11 28.2	6.87	2 10.6
24	7 54 55.24	1.806	21 22 6.0	4.87	3 44.8	24	8 19 38.27	2.137	20 8 42.6	6.93	2 7.5
25	7 55 38.77	1.821	21 20 8.4	4.94	3 41.6	25	8 20 29.63	2.143	20 5 55.5	6.99	2 4.5
26	7 56 22.65	1.835	21 18 9.1	5.00	3 38.4	26	8 21 21.15	2.150	20 3 6.9	7.05	2 1.4
27	7 57 6.87	1.850	21 16 8.2	5.07	3 35.2	27	8 22 12.83	2.156	20 0 16.9	7.11	1 58.3
28	7 57 51.43	1.864	21 14 5.6	5.14	3 32.1	28	8 23 4.65	2.162	19 57 25.4	7.17	1 55.2
29	7 58 36.32	1.878	21 12 1.4	5.21	3 28.9	29	8 23 56.61	2.168	19 54 32.5	7.23	1 52.2
30	7 59 21.54	1.891	21 9 55.5	5.28	3 25.7	30	8 24 48.70	2.173	19 51 38.1	7.29	1 49.1
31	8 0 7.08	1.904	21 7 47.9	5.35	3 22.5	31	8 25 40.92	2.179	19 48 42.3	7.35	1 46.0
32	8 0 52.93	+1.917	+21 5 38.7	-5.42	3 19.4	32	8 26 33.26	+2.184	+19 45 45.1	-7.41	1 43.0
Day of the Month,						Day of the Month,					
1st.						1st.					
11th.						11th.					
21st.						21st.					
31st.						31st.					
Polar Semidiameter						Polar Semidiameter					
Horizontal Parallax						Horizontal Parallax					
17.1						15.9					
1.6						1.5					
16.6						15.6					
1.6						1.5					
16.2						15.3					
1.5						1.4					
15.9						15.1					
1.5						1.4					

NOTE.—North declinations are marked +, south declinations —. + prefixed to the hourly change of declination, indicates that south declinations

## GREENWICH MEAN TIME.

JULY						AUGUST.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.
Noon.	Noon.	Noon.	Noon.	Noon.		Noon.	Noon.	Noon.	Noon.		
h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m	
1	8 25 40.92	+2.179	+19 48 42.3	-7.35	1 46.0	1	8 53 15.34	+2.237	+18 7 32.3	-8.86	0 11.7
2	8 26 33.26	2.184	19 45 45.1	7.41	1 43.0	2	8 54 9.00	2.236	18 3 59.5	8.89	0 8.6
3	8 27 25.73	2.189	19 42 46.5	7.47	1 40.0	3	8 55 2.63	2.235	18 0 25.9	8.92	0 5.6
4	8 28 18.32	2.194	19 39 46.6	7.53	1 36.9	4	8 55 56.22	2.233	17 56 51.4	8.95	0 2.5
5	8 29 11.02	2.198	19 36 45.3	7.59	1 33.8	5	8 56 49.77	2.231	17 53 16.2	8.98	23 56 5
6	8 30 3.82	2.202	19 33 42.6	7.65	1 30.7	6	8 57 43.29	2.229	17 49 40.2	9.01	23 53.4
7	8 30 56.72	2.206	19 30 38.6	7.70	1 27.7	7	8 58 36.71	2.226	17 46 3.4	9.04	23 50.4
8	8 31 49.71	2.210	19 27 33.3	7.76	1 24.6	8	8 59 30.10	2.224	17 42 25.9	9.07	23 47.3
9	8 32 42.78	2.213	19 24 26.7	7.81	1 21.6	9	9 0 23.43	2.221	17 38 47.8	9.10	23 44.3
10	8 33 35.92	2.216	19 21 18.7	7.86	1 18.5	10	9 1 16.69	2.218	17 35 9.0	9.13	23 41.2
11	8 34 29.14	2.219	19 18 9.4	7.91	1 15.5	11	9 2 9.88	2.215	17 31 29.5	9.16	23 38.2
12	8 35 22.43	2.222	19 14 58.9	7.96	1 12.4	12	9 3 2.99	2.212	17 27 49.4	9.18	23 35.1
13	8 36 15.79	2.224	19 11 47.1	8.01	1 9.4	13	9 3 56.01	2.209	17 24 8.8	9.20	23 32.1
14	8 37 9.20	2.226	19 8 34.1	8.06	1 6.3	14	9 4 48.94	2.204	17 20 27.7	9.22	23 29.0
15	8 38 2.66	2.228	19 5 20.0	8.11	1 3.3	15	9 5 41.78	2.200	17 16 46.0	9.24	23 26.0
16	8 38 56.17	2.230	19 2 4.7	8.16	1 0.3	16	9 6 34.52	2.196	17 13 3.8	9.26	23 22.9
17	8 39 49.73	2.232	18 58 48.2	8.21	0 57.2	17	9 7 27.16	2.192	17 9 21.1	9.28	23 19.9
18	8 40 43.32	2.234	18 55 30.6	8.26	0 54.2	18	9 8 19.69	2.187	17 5 38.0	9.30	23 16.8
19	8 41 36.94	2.235	18 52 11.9	8.31	0 51.2	19	9 9 12.12	2.182	17 1 54.5	9.32	23 13.7
20	8 42 30.60	2.236	18 48 52.0	8.35	0 48.1	20	9 10 4.44	2.178	16 58 10.7	9.34	23 10.6
21	8 43 24.29	2.237	18 45 31.0	8.40	0 45.1	21	9 10 56.65	2.173	16 54 26.5	9.35	23 7.6
22	8 44 18.00	2.238	18 42 8.9	8.44	0 42.0	22	9 11 48.74	2.168	16 50 41.9	9.36	23 4.5
23	8 45 11.72	2.239	18 38 45.8	8.49	0 39.0	23	9 12 40.70	2.163	16 46 56.9	9.37	23 1.4
24	8 46 5.46	2.239	18 35 21.6	8.53	0 36.0	24	9 13 32.54	2.158	16 43 11.7	9.38	22 58.3
25	8 46 59.21	2.240	18 31 56.4	8.58	0 32.9	25	9 14 24.25	2.152	16 39 26.3	9.39	22 55.3
26	8 47 52.96	2.240	18 28 30.1	8.62	0 29.9	26	9 15 15.82	2.146	16 35 40.6	9.40	22 52.2
27	8 48 46.72	2.240	18 25 2.8	8.66	0 26.9	27	9 16 7.25	2.140	16 31 54.7	9.41	22 49.1
28	8 49 40.47	2.240	18 21 34.6	8.70	0 23.8	28	9 16 58.53	2.134	16 28 8.7	9.42	22 46.0
29	8 50 34.21	2.239	18 18 5.4	8.74	0 20.8	29	9 17 49.67	2.128	16 24 22.5	9.42	22 42.9
30	8 51 27.94	2.239	18 14 35.2	8.78	0 17.8	30	9 18 40.66	2.121	16 20 36.2	9.43	22 39.8
31	8 52 21.65	2.238	18 11 4.2	8.82	0 14.7	31	9 19 31.49	2.114	16 16 49.8	9.43	22 36.7
32	8 53 15.34	+2.237	+18 7 32.3	-8.86	0 11.7	32	9 20 22.15	+2.107	+16 13 3.4	-9.42	22 33.6
Day of the Month,						Day of the Month,					
1st.						1st.					
11th.						11th.					
21st.						21st.					
31st.						31st.					
Polar Semidiameter		15.1	15.0	14.9	14.9	Polar Semidiameter		14.9	14.9	15.0	15.1
Horizontal Parallax		1.4	1.4	1.4	1.4	Horizontal Parallax		1.4	1.4	1.4	1.4

north declinations are increasing, and south declinations are decreasing; — indicates that north declinations are decreasing, increasing.



## GREENWICH MEAN TIME.

SEPTEMBER.						OCTOBER.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
1	9 20 22.15	+2.107	+16 13 3.4	-9.43	22 33.6	1	9 43 59.11	+1.798	+14 22 43.9	-8.71	20 59.1
2	9 21 12.63	2.100	16 9 17.0	9.43	22 30.5	2	9 44 42.09	1.784	14 19 15.4	8.66	20 55.9
3	9 22 2.93	2.092	16 5 30.6	9.43	22 27.4	3	9 45 24.74	1.770	14 15 48.1	8.61	20 52.6
4	9 22 53.05	2.084	16 1 44.3	9.43	22 24.3	4	9 46 7.05	1.756	14 12 22.0	8.56	20 49.4
5	9 23 42.98	2.076	15 57 58.2	9.42	22 21.2	5	9 46 49.01	1.741	14 8 57.2	8.50	20 46.2
6	9 24 32.71	2.068	15 54 12.2	9.41	22 18.1	6	9 47 30.63	1.726	14 5 33.8	8.44	20 43.0
7	9 25 22.24	2.060	15 50 26.5	9.40	22 15.0	7	9 48 11.89	1.711	14 2 11.9	8.38	20 39.7
8	9 26 11.57	2.051	15 46 41.1	9.39	22 11.9	8	9 48 52.78	1.696	13 58 51.5	8.32	20 36.5
9	9 27 0.69	2.042	15 42 55.9	9.38	22 8.8	9	9 49 33.29	1.680	13 55 32.6	8.26	20 33.2
10	9 27 49.60	2.033	15 39 11.0	9.37	22 5.7	10	9 50 13.42	1.664	13 52 15.2	8.19	20 29.9
11	9 28 38.29	2.024	15 35 26.4	9.35	22 2.6	11	9 50 53.17	1.648	13 48 59.4	8.12	20 26.6
12	9 29 26.76	2.015	15 31 42.2	9.33	21 59.5	12	9 51 32.54	1.632	13 45 45.2	8.05	20 23.3
13	9 30 15.00	2.006	15 27 58.4	9.31	21 56.3	13	9 52 11.53	1.616	13 42 32.8	7.98	20 20.0
14	9 31 3.01	1.995	15 24 15.1	9.29	21 53.2	14	9 52 50.13	1.600	13 39 22.2	7.91	20 16.7
15	9 31 50.79	1.985	15 20 32.2	9.27	21 50.1	15	9 53 28.32	1.583	13 36 13.3	7.83	20 13.4
16	9 32 38.33	1.975	15 16 49.9	9.25	21 46.9	16	9 54 6.10	1.566	13 33 6.2	7.75	20 10.1
17	9 33 25.61	1.965	15 13 8.1	9.22	21 43.7	17	9 54 43.47	1.549	13 30 1.0	7.67	20 6.8
18	9 34 12.64	1.955	15 9 26.9	9.20	21 40.6	18	9 55 20.42	1.531	13 26 57.7	7.59	20 3.5
19	9 34 59.42	1.944	15 5 46.4	9.17	21 37.4	19	9 55 56.95	1.513	13 23 56.4	7.51	20 0.1
20	9 35 45.95	1.933	15 2 6.6	9.14	21 34.2	20	9 56 33.05	1.495	13 20 57.1	7.42	19 56.8
21	9 36 32.21	1.922	14 58 27.5	9.11	21 31.0	21	9 57 8.70	1.477	13 17 59.9	7.34	19 53.5
22	9 37 18.20	1.911	14 54 49.1	9.08	21 27.9	22	9 57 43.91	1.458	13 15 4.7	7.25	19 50.1
23	9 38 3.92	1.899	14 51 11.4	9.05	21 24.7	23	9 58 18.67	1.439	13 12 11.7	7.16	19 46.7
24	9 38 49.36	1.887	14 47 34.5	9.01	21 21.5	24	9 58 52.97	1.420	13 9 20.9	7.07	19 43.4
25	9 39 34.51	1.875	14 43 58.5	8.97	21 18.3	25	9 59 26.81	1.400	13 6 32.4	6.98	19 40.0
26	9 40 19.37	1.863	14 40 23.5	8.93	21 15.1	26	10 0 0.18	1.380	13 3 46.2	6.88	19 36.6
27	9 41 3.93	1.851	14 36 49.5	8.89	21 11.9	27	10 0 33.06	1.360	13 1 2.4	6.78	19 33.2
28	9 41 48.20	1.838	14 33 16.5	8.85	21 8.7	28	10 1 5.46	1.340	12 58 21.0	6.68	19 29.8
29	9 42 32.16	1.825	14 29 44.5	8.81	21 5.5	29	10 1 37.37	1.319	12 55 42.1	6.58	19 26.4
30	9 43 15.80	1.812	14 26 13.6	8.76	21 2.3	30	10 2 8.78	1.298	12 53 5.7	6.47	19 23.0
31	9 43 59.11	1.798	14 22 43.9	8.71	20 59.1	31	10 2 39.68	1.277	12 50 31.8	6.36	19 19.6
32	9 44 42.09	+1.784	+14 19 15.4	+8.66	20 55.9	32	10 3 10.07	+1.255	+12 46 0.5	-6.25	19 16.2
Day of the Month.						Day of the Month.					
1st.						1st.					
11th.						11th.					
21st.						21st.					
31st.						31st.					
Polar Semidiameter 15.1						Polar Semidiameter 15.7					
Horizontal Parallax 1.4						Horizontal Parallax 1.5					

NOTE.—North declinations are marked +, south declinations —. + prefixed to the hourly change of declination, indicates that south declinations

## GREENWICH MEAN TIME.

NOVEMBER.						DECEMBER.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
1	h m s 10 3 10.07	+1.255	12 48 0.5	-6.25	h m 19 16.2	1	h m s 10 13 51.62	+0.488	11 56 35.8	-2.06	h m 17 28.6
2	10 3 39.94	1.233	12 45 31.9	6.14	19 12.8	2	10 14 2.99	0.459	11 55 48.5	1.89	17 24.8
3	10 4 9.28	1.211	12 43 6.1	6.02	19 9.3	3	10 14 13.65	0.430	11 55 5.3	1.73	17 21.0
4	10 4 38.08	1.189	12 40 43.1	5.90	19 5.8	4	10 14 23.59	0.400	11 54 26.1	1.56	17 17.2
5	10 5 6.34	1.166	12 38 22.9	5.78	19 2.3	5	10 14 32.92	0.370	11 53 50.8	1.39	17 13.4
6	10 5 34.06	1.143	12 36 5.6	5.66	18 58.8	6	10 14 41.33	0.340	11 53 19.6	1.22	17 9.6
7	10 6 1.22	1.120	12 33 51.2	5.54	18 55.3	7	10 14 49.11	0.309	11 52 52.6	1.05	17 5.8
8	10 6 27.82	1.097	12 31 39.7	5.41	18 51.8	8	10 14 56.17	0.279	11 52 29.6	0.88	17 2.0
9	10 6 53.86	1.073	12 29 31.3	5.28	18 48.3	9	10 15 2.51	0.249	11 52 10.7	0.70	16 58.2
10	10 7 19.33	1.049	12 27 25.9	5.15	18 44.8	10	10 15 8.13	0.219	11 51 56.0	0.53	16 54.3
11	10 7 44.22	1.025	12 25 23.7	5.02	18 41.3	11	10 15 13.02	0.188	11 51 45.4	0.36	16 50.5
12	10 8 8.53	1.000	12 23 24.6	4.89	18 37.7	12	10 15 17.17	0.158	11 51 39.0	0.19	16 46.6
13	10 8 32.25	0.976	12 21 28.7	4.76	18 34.2	13	10 15 20.58	0.127	11 51 36.7	-0.02	16 42.7
14	10 8 55.38	0.951	12 19 36.0	4.63	18 30.7	14	10 15 23.25	0.096	11 51 38.6	+0.16	16 38.8
15	10 9 17.91	0.926	12 17 46.5	4.49	18 27.1	15	10 15 25.19	0.065	11 51 44.7	0.33	16 34.9
16	10 9 39.83	0.900	12 16 0.4	4.35	18 23.5	16	10 15 26.39	0.034	11 51 54.9	0.50	16 31.0
17	10 10 1.14	0.875	12 14 17.7	4.21	18 19.9	17	10 15 26.84	+0.003	11 52 9.3	0.68	16 27.1
18	10 10 21.84	0.849	12 12 38.4	4.07	18 16.3	18	10 15 26.54	-0.028	11 52 27.9	0.86	16 23.1
19	10 10 41.92	0.823	12 11 2.4	3.93	18 12.7	19	10 15 25.50	0.059	11 52 50.7	1.04	16 19.2
20	10 11 1.36	0.797	12 9 29.9	3.78	18 9.1	20	10 15 23.72	0.091	11 53 17.6	1.22	16 15.2
21	10 11 20.16	0.770	12 8 1.0	3.63	18 5.5	21	10 15 21.19	0.122	11 53 48.7	1.39	16 11.2
22	10 11 38.31	0.743	12 6 35.6	3.48	18 1.9	22	10 15 17.90	0.153	11 54 24.0	1.56	16 7.2
23	10 11 55.81	0.715	12 5 13.9	3.33	17 58.2	23	10 15 13.86	0.184	11 55 3.5	1.74	16 3.2
24	10 12 12.65	0.688	12 3 55.9	3.17	17 54.5	24	10 15 9.06	0.215	11 55 47.2	1.91	15 59.2
25	10 12 28.83	0.660	12 2 41.6	3.02	17 50.8	25	10 15 3.52	0.246	11 56 35.1	2.08	15 55.1
26	10 12 44.34	0.633	12 1 31.0	2.86	17 47.1	26	10 14 57.24	0.277	11 57 27.1	2.25	15 51.1
27	10 12 59.17	0.604	12 0 24.2	2.70	17 43.4	27	10 14 50.22	0.308	11 58 23.2	2.42	15 47.1
28	10 13 13.32	0.575	11 59 21.3	2.54	17 39.7	28	10 14 42.46	0.339	11 59 23.3	2.59	15 43.0
29	10 13 26.78	0.546	11 58 22.3	2.38	17 36.0	29	10 14 33.95	0.370	12 0 27.5	2.76	15 38.9
30	10 13 39.55	0.517	11 57 27.1	2.22	17 32.3	30	10 14 24.71	0.401	12 1 35.8	2.92	15 34.8
31	10 13 51.62	0.488	11 56 35.8	2.06	17 28.6	31	10 14 14.74	0.430	12 2 48.0	3.09	15 30.7
32	10 14 2.99	+0.459	+11 55 48.5	-1.89	17 24.8	32	10 14 4.05	-0.461	+12 4 4.2	+3.25	15 26.6
Day of the Month,						Day of the Month,					
		1st.	11th.	21st.	31st.			1st.	11th.	21st.	31st.
Polar Semidiameter		16.9	17.4	17.9	18.4	Polar Semidiameter		18.4	19.0	19.6	20.1
Horizontal Parallax		1.6	1.6	1.7	1.7	Horizontal Parallax		1.7	1.8	1.8	1.9

north declinations are increasing, and south declinations are decreasing; — indicates that north declinations are decreasing, increasing.

## GREENWICH MEAN TIME.

JANUARY.						FEBRUARY					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>o</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>	<sup>h</sup> <sup>m</sup>		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>o</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>	<sup>h</sup> <sup>m</sup>
1	18 52 13.59	+1.377	22 30 14.1	+1.42	0 10.4	1	19 7 41.02	+1.183	22 10 1.3	+1.77	22 20.4
2	18 52 44.23	1.377	22 29 39.9	1.43	0 6.9	2	19 8 9.34	1.177	22 9 18.7	1.78	22 17.0
3	18 53 14.87	1.377	22 29 5.3	1.45	0 3.5	3	19 8 37.51	1.171	22 8 36.0	1.78	22 13.5
4	18 53 45.51	1.376	22 28 30.3	1.47	{ 0 0.1 23 56.7	4	19 9 5.53	1.164	22 7 53.2	1.78	22 10.0
5	18 54 16.14	1.376	22 27 54.9	1.48	23 53.2	5	19 9 33.39	1.157	22 7 10.4	1.79	22 6.6
6	18 54 46.76	1.375	22 27 19.1	1.50	23 49.8	6	19 10 1.07	1.150	22 6 27.5	1.79	22 3.1
7	18 55 17.36	1.374	22 26 42.8	1.52	23 46.4	7	19 10 28.57	1.142	22 5 44.5	1.79	21 59.6
8	18 55 47.93	1.373	22 26 6.2	1.53	23 43.0	8	19 10 55.90	1.135	22 5 1.5	1.79	21 56.1
9	18 56 18.48	1.372	22 25 29.3	1.55	23 39.5	9	19 11 23.05	1.128	22 4 18.5	1.79	21 52.6
10	18 56 49.00	1.371	22 24 52.0	1.56	23 36.1	10	19 11 50.02	1.120	22 3 35.5	1.79	21 49.1
11	18 57 19.48	1.369	22 24 14.3	1.58	23 32.7	11	19 12 16.80	1.112	22 2 52.6	1.79	21 45.6
12	18 57 49.92	1.367	22 23 36.3	1.59	23 29.3	12	19 12 43.38	1.103	22 2 9.7	1.79	21 42.1
13	18 58 20.31	1.365	22 22 57.9	1.61	23 25.8	13	19 13 9.75	1.095	22 1 26.8	1.79	21 38.6
14	18 58 50.63	1.363	22 22 19.2	1.62	23 22.4	14	19 13 35.92	1.086	22 0 44.0	1.78	21 35.1
15	18 59 20.88	1.359	22 21 40.3	1.63	23 19.0	15	19 14 1.87	1.077	22 0 1.3	1.78	21 31.6
16	18 59 51.06	1.356	22 21 1.1	1.64	23 15.6	16	19 14 27.60	1.068	21 59 18.6	1.78	21 28.1
17	19 0 21.17	1.353	22 20 21.6	1.65	23 12.1	17	19 14 53.11	1.058	21 58 36.0	1.77	21 24.6
18	19 0 51.20	1.350	22 19 41.8	1.66	23 8.7	18	19 15 18.40	1.049	21 57 53.6	1.76	21 21.1
19	19 1 21.15	1.346	22 19 1.7	1.67	23 5.3	19	19 15 43.47	1.040	21 57 11.4	1.76	21 17.6
20	19 1 51.02	1.343	22 18 21.4	1.69	23 1.8	20	19 16 8.31	1.030	21 56 29.3	1.75	21 14.0
21	19 2 20.80	1.339	22 17 40.8	1.70	22 58.4	21	19 16 32.91	1.020	21 55 47.4	1.74	21 10.5
22	19 2 50.48	1.335	22 17 0.0	1.70	22 54.9	22	19 16 57.27	1.010	21 55 5.7	1.73	21 7.0
23	19 3 20.06	1.330	22 16 19.0	1.71	22 51.5	23	19 17 21.38	0.999	21 54 24.2	1.73	21 3.4
24	19 3 49.54	1.326	22 15 37.8	1.72	22 48.0	24	19 17 45.24	0.989	21 53 42.9	1.72	20 59.9
25	19 4 18.91	1.321	22 14 56.3	1.73	22 44.0	25	19 18 8.85	0.978	21 53 1.8	1.71	20 56.4
26	19 4 48.16	1.316	22 14 14.6	1.74	22 41.1	26	19 18 32.20	0.967	21 52 21.0	1.70	20 52.8
27	19 5 17.29	1.311	22 13 32.7	1.75	22 37.6	27	19 18 55.29	0.956	21 51 40.5	1.68	20 49.3
28	19 5 46.30	1.306	22 12 50.7	1.75	22 34.2	28	19 19 18.11	0.945	21 51 0.2	1.67	20 45.7
29	19 6 15.18	1.301	22 12 8.5	1.76	22 30.8	29	19 19 40.67	0.934	21 50 20.2	1.66	20 42.1
30	19 6 43.93	1.185	22 11 26.2	1.76	22 27.3	30	19 20 2.96	0.923	21 49 40.5	1.65	20 38.6
31	19 7 12.55	1.189	22 10 43.8	1.77	22 23.9	31	19 20 24.98	0.912	21 49 1.1	1.63	20 35.0
32	19 7 41.02	+1.183	22 10 1.3	+1.77	22 20.4	32	19 20 46.72	+0.900	21 48 22.1	+1.62	20 31.4
Day of the Month,	1st.	11th.	21st.	31st.		Day of the Month,	1st.	11th.	21st.	31st.	
Polar Semidiameter	7'.1	7'.1	7'.1	7'.2		Polar Semidiameter	7'.2	7'.2	7'.3	7'.4	
Horizontal Parallax	0.8	0.8	0.8	0.8		Horizontal Parallax	0.8	0.8	0.8	0.8	

NOTE.—North declinations are marked +, south declinations —.

## GREENWICH MEAN TIME.

MARCH.						APRIL.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.
Noon.	Noon.	Noon.	Noon.	Noon.		Noon.	Noon.	Noon.	Noon.		
h m s	"	"	"	"	h m	h m s	"	"	"	"	h m
1 19 20 2.96	+0.923	-21 49 40.5	+1.65	20 38.6	1 19 28 56.57	+0.480	-21 33 8.5	+0.93	18 45.4		
2 19 20 24.98	0.912	21 49 1.1	1.63	20 35.0	2 19 29 8.13	0.474	21 32 46.7	0.89	18 41.6		
3 19 20 46.72	0.900	21 48 22.1	1.62	20 31.4	3 19 29 19.30	0.457	21 32 25.7	0.86	18 37.9		
4 19 21 8.17	0.888	21 47 43.4	1.60	20 27.8	4 19 29 30.08	0.441	21 32 5.5	0.83	18 34.1		
5 19 21 29.32	0.875	21 47 5.1	1.59	20 24.3	5 19 29 40.46	0.424	21 31 46.0	0.80	18 30.4		
6 19 21 50.17	0.862	21 46 27.2	1.57	20 20.7	6 19 29 50.45	0.408	21 31 27.3	0.76	18 26.6		
7 19 22 10.72	0.850	21 45 49.8	1.55	20 17.1	7 19 30 0.04	0.391	21 31 9.5	0.73	18 22.8		
8 19 22 30.97	0.838	21 45 12.8	1.53	20 13.5	8 19 30 9.23	0.374	21 30 52.5	0.69	18 19.0		
9 19 22 50.92	0.825	21 44 36.2	1.52	20 9.9	9 19 30 18.01	0.358	21 30 36.3	0.66	18 15.3		
10 19 23 10.56	0.812	21 44 0.0	1.50	20 6.2	10 19 30 26.39	0.341	21 30 21.0	0.62	18 11.5		
11 19 23 29.88	0.798	21 43 24.3	1.48	20 2.6	11 19 30 34.36	0.324	21 30 6.6	0.58	18 7.7		
12 19 23 48.87	0.785	21 42 49.0	1.46	19 59.0	12 19 30 41.92	0.307	21 29 53.0	0.55	18 3.8		
13 19 24 7.54	0.771	21 42 14.2	1.44	19 55.4	13 19 30 49.08	0.290	21 29 40.3	0.51	18 0.0		
14 19 24 25.88	0.757	21 41 40.0	1.41	19 51.8	14 19 30 55.83	0.273	21 29 28.5	0.48	17 56.2		
15 19 24 43.89	0.744	21 41 6.3	1.39	19 48.1	15 19 31 2.18	0.256	21 29 17.5	0.44	17 52.4		
16 19 25 1.57	0.730	21 40 33.2	1.37	19 44.5	16 19 31 8.12	0.239	21 29 7.4	0.40	17 48.5		
17 19 25 18.91	0.715	21 40 0.7	1.34	19 40.8	17 19 31 13.65	0.222	21 28 58.2	0.36	17 44.7		
18 19 25 35.91	0.701	21 39 28.7	1.32	19 37.2	18 19 31 18.76	0.204	21 28 50.0	0.32	17 40.8		
19 19 25 52.56	0.687	21 38 57.3	1.30	19 33.5	19 19 31 23.46	0.187	21 28 42.7	0.29	17 37.0		
20 19 26 8.87	0.672	21 38 26.5	1.27	19 29.9	20 19 31 27.74	0.170	21 28 36.3	0.25	17 33.1		
21 19 26 24.83	0.658	21 37 56.3	1.25	19 26.2	21 19 31 31.61	0.153	21 28 30.8	0.21	17 29.2		
22 19 26 40.44	0.643	21 37 26.7	1.22	19 22.5	22 19 31 35.07	0.136	21 28 26.2	0.17	17 25.4		
23 19 26 55.70	0.629	21 36 57.8	1.19	19 18.8	23 19 31 38.12	0.118	21 28 22.5	0.14	17 21.5		
24 19 27 10.61	0.614	21 36 29.5	1.16	19 15.1	24 19 31 40.75	0.101	21 28 19.7	0.10	17 17.6		
25 19 27 25.15	0.598	21 36 1.9	1.14	19 11.4	25 19 31 42.97	0.084	21 28 17.8	0.06	17 13.7		
26 19 27 39.32	0.583	21 35 35.0	1.11	19 7.7	26 19 31 44.78	0.067	21 28 16.9	+0.02	17 9.8		
27 19 27 53.12	0.567	21 35 8.8	1.08	19 4.0	27 19 31 46.17	0.049	21 28 16.9	-0.02	17 5.8		
28 19 28 6.55	0.552	21 34 43.3	1.05	19 0.3	28 19 31 47.15	0.032	21 28 17.9	0.06	17 1.9		
29 19 28 19.61	0.536	21 34 18.5	1.02	18 56.6	29 19 31 47.71	+0.015	21 28 19.8	0.10	16 58.0		
30 19 28 32.30	0.521	21 33 54.4	0.99	18 52.9	30 19 31 47.85	-0.003	21 28 22.6	0.14	16 54.1		
31 19 28 44.62	0.506	21 33 31.1	0.96	18 49.2	31 19 31 47.57	0.020	21 28 26.4	0.18	16 50.1		
32 19 28 56.57	+0.480	-21 33 8.5	+0.93	18 45.4	32 19 31 46.88	-0.038	-21 28 31.1	-0.21	16 46.2		
Day of the Month,	1st.	11th.	21st.	31st.	Day of the Month,	1st.	11th.	21st.	31st.		
Polar Semidiameter	7.4	7.5	7.6	7.7	Polar Semidiameter	7.7	7.9	8.0	8.1		
Horizontal Parallax	0.8	0.8	0.9	0.9	Horizontal Parallax	0.9	0.9	0.9	0.9		

+ prefixed to the hourly change of declination, indicates that north declinations are increasing, and south declinations are decreasing; — indicates that north declinations are decreasing, south declinations increasing.

## GREENWICH MEAN TIME.

MAY.						JUNE.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m
1	19 31 47.57	-0.020	21 28 26.4	-0.18	16 50.1	1	19 28 22.35	-0.510	21 37 38.1	-1.25	14 44.7
2	19 31 46.88	0.038	21 28 31.1	0.21	16 46.2	2	19 28 9.94	0.534	21 38 8.3	1.27	14 40.6
3	19 31 45.77	0.055	21 28 36.7	0.25	16 42.2	3	19 27 57.22	0.536	21 38 39.1	1.30	14 36.4
4	19 31 44.25	0.072	21 28 43.2	0.29	16 38.3	4	19 27 44.20	0.549	21 39 10.5	1.32	14 32.3
5	19 31 42.31	0.090	21 28 50.6	0.33	16 34.3	5	19 27 30.88	0.561	21 39 42.5	1.35	14 28.1
6	19 31 39.95	0.107	21 28 59.0	0.37	16 30.3	6	19 27 17.26	0.574	21 40 15.1	1.37	14 24.0
7	19 31 37.18	0.124	21 29 8.3	0.41	16 26.3	7	19 27 3.35	0.585	21 40 48.3	1.39	14 19.8
8	19 31 34.00	0.141	21 29 18.5	0.44	16 22.4	8	19 26 49.16	0.597	21 41 22.0	1.41	14 15.6
9	19 31 30.42	0.158	21 29 29.6	0.48	16 18.4	9	19 26 34.69	0.609	21 41 56.2	1.44	14 11.5
10	19 31 26.43	0.175	21 29 41.6	0.52	16 14.4	10	19 26 19.95	0.620	21 42 31.0	1.46	14 7.3
11	19 31 22.04	0.191	21 29 54.6	0.56	16 10.4	11	19 26 4.95	0.630	21 43 6.3	1.48	14 3.1
12	19 31 17.25	0.208	21 30 8.5	0.60	16 6.3	12	19 25 49.71	0.640	21 43 42.0	1.50	13 58.9
13	19 31 12.07	0.224	21 30 23.3	0.63	16 2.3	13	19 25 34.23	0.650	21 44 18.1	1.51	13 54.7
14	19 31 6.49	0.241	21 30 38.9	0.67	15 58.3	14	19 25 18.51	0.660	21 44 54.6	1.53	13 50.5
15	19 31 0.51	0.258	21 30 55.3	0.70	15 54.2	15	19 25 2.56	0.670	21 45 31.6	1.55	13 46.3
16	19 30 54.13	0.274	21 31 12.6	0.74	15 50.2	16	19 24 46.39	0.679	21 46 9.0	1.56	13 42.1
17	19 30 47.36	0.290	21 31 30.8	0.78	15 46.1	17	19 24 30.01	0.687	21 46 46.7	1.58	13 37.9
18	19 30 40.22	0.305	21 31 49.8	0.81	15 42.1	18	19 24 13.42	0.695	21 47 24.7	1.59	13 33.7
19	19 30 32.71	0.321	21 32 9.7	0.85	15 38.0	19	19 23 56.64	0.703	21 48 3.1	1.61	13 29.5
20	19 30 24.83	0.336	21 32 30.4	0.88	15 34.0	20	19 23 39.67	0.711	21 48 41.9	1.62	13 25.3
21	19 30 16.58	0.351	21 32 51.9	0.91	15 29.9	21	19 23 22.52	0.718	21 49 21.0	1.63	13 21.0
22	19 30 7.97	0.366	21 33 14.2	0.95	15 25.8	22	19 23 5.19	0.726	21 50 0.3	1.64	13 16.8
23	19 29 58.99	0.381	21 33 37.3	0.98	15 21.7	23	19 22 47.69	0.733	21 50 39.7	1.65	13 12.6
24	19 29 49.64	0.397	21 34 1.2	1.01	15 17.6	24	19 22 30.03	0.739	21 51 19.3	1.65	13 8.4
25	19 29 39.93	0.412	21 34 25.8	1.04	15 13.5	25	19 22 12.23	0.745	21 51 59.1	1.66	13 4.1
26	19 29 29.87	0.426	21 34 51.1	1.07	15 9.4	26	19 21 54.29	0.750	21 52 39.1	1.67	12 59.9
27	19 29 19.46	0.441	21 35 17.1	1.10	15 5.3	27	19 21 36.22	0.756	21 53 19.3	1.68	12 55.7
28	19 29 8.71	0.455	21 35 43.9	1.13	15 1.2	28	19 21 18.02	0.761	21 53 59.7	1.69	12 51.4
29	19 28 57.61	0.469	21 36 11.4	1.16	14 57.1	29	19 20 59.71	0.765	21 54 40.2	1.69	12 47.2
30	19 28 46.18	0.483	21 36 39.6	1.19	14 53.0	30	19 20 41.30	0.769	21 55 20.8	1.69	12 43.0
31	19 28 34.43	0.496	21 37 8.5	1.22	14 48.8	31	19 20 22.80	0.773	21 56 1.5	1.70	12 38.7
32	19 28 22.35	-0.510	21 37 38.1	-1.25	14 44.7	32	19 20 4.21	-0.776	21 56 42.2	-1.70	12 34.5
Day of the Month.						Day of the Month.					
		1st.	11th.	21st.	31st.			1st.	11th.	21st.	31st.
Polar Semidiameter		8".1	8".2	8".4	8".5	Polar Semidiameter		8".5	8".6	8".6	8".7
Horizontal Parallax		0.9	0.9	1.0	1.0	Horizontal Parallax		1.0	1.0	1.0	1.0

NOTE.—North declinations are marked +, south declinations —.

## GREENWICH MEAN TIME.

JULY.						AUGUST.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
1	h m s 19 20 22.80	-0.773	21 56 1.5	-1.70	h m 12 38.7	1	h m s 19 10 54.50	-0.693	22 15 58.0	-1.41	h m 10 27.5
2	19 20 4.21	0.776	21 56 42.2	1.70	12 34.5	2	19 10 37.98	0.684	22 16 31.7	1.40	10 23.3
3	19 19 45.54	0.779	21 57 22.9	1.70	12 30.3	3	19 10 21.68	0.675	22 17 5.0	1.38	10 19.1
4	19 19 26.80	0.782	21 58 3.7	1.70	12 26.0	4	19 10 5.60	0.665	22 17 37.8	1.36	10 14.9
5	19 19 8.00	0.784	21 58 44.5	1.70	12 21.8	5	19 9 49.75	0.655	22 18 10.1	1.34	10 10.7
6	19 18 49.16	0.786	21 59 25.3	1.70	12 17.5	6	19 9 34.14	0.645	22 18 41.9	1.31	10 6.5
7	19 18 30.28	0.787	22 0 6.0	1.69	12 13.3	7	19 9 18.78	0.635	22 19 13.2	1.29	10 2.3
8	19 18 11.37	0.788	22 0 46.6	1.69	12 9.0	8	19 9 3.66	0.625	22 19 44.0	1.27	9 58.1
9	19 17 52.44	0.789	22 1 27.1	1.69	12 4.8	9	19 8 48.80	0.614	22 20 14.3	1.25	9 53.9
10	19 17 33.50	0.789	22 2 7.6	1.68	12 0.6	10	19 8 34.21	0.602	22 20 44.1	1.23	9 49.8
11	19 17 14.57	0.788	22 2 47.9	1.68	11 56.3	11	19 8 19.90	0.590	22 21 13.3	1.21	9 45.6
12	19 16 55.66	0.787	22 3 28.1	1.67	11 52.1	12	19 8 5.88	0.578	22 21 42.0	1.19	9 41.4
13	19 16 36.77	0.786	22 4 8.1	1.66	11 47.8	13	19 7 52.15	0.566	22 22 10.2	1.16	9 37.3
14	19 16 17.92	0.785	22 4 48.0	1.66	11 43.6	14	19 7 38.72	0.553	22 22 37.9	1.14	9 33.1
15	19 15 59.11	0.783	22 5 27.7	1.65	11 39.4	15	19 7 25.59	0.541	22 23 5.0	1.12	9 29.0
16	19 15 40.35	0.780	22 6 7.2	1.64	11 35.1	16	19 7 12.77	0.528	22 23 31.5	1.09	9 24.8
17	19 15 21.66	0.778	22 6 46.4	1.63	11 30.8	17	19 7 0.26	0.515	22 23 57.4	1.07	9 20.7
18	19 15 3.03	0.775	22 7 25.4	1.62	11 26.6	18	19 6 48.06	0.502	22 24 22.8	1.05	9 16.6
19	19 14 44.48	0.771	22 8 4.2	1.61	11 22.4	19	19 6 36.18	0.488	22 24 47.6	1.02	9 12.4
20	19 14 26.01	0.767	22 8 42.7	1.60	11 18.1	20	19 6 24.63	0.474	22 25 11.8	1.00	9 8.3
21	19 14 7.64	0.763	22 9 20.9	1.59	11 13.9	21	19 6 13.42	0.460	22 25 35.4	0.97	9 4.2
22	19 13 49.38	0.759	22 9 58.8	1.57	11 9.7	22	19 6 2.56	0.445	22 25 58.4	0.95	9 0.1
23	19 13 31.23	0.754	22 10 36.4	1.56	11 5.4	23	19 5 52.04	0.431	22 26 20.8	0.92	8 56.0
24	19 13 13.21	0.748	22 11 13.6	1.54	11 1.2	24	19 5 41.87	0.416	22 26 42.7	0.90	8 51.9
25	19 12 55.32	0.742	22 11 50.5	1.53	10 57.0	25	19 5 32.06	0.401	22 27 4.0	0.88	8 47.8
26	19 12 37.57	0.736	22 12 27.1	1.52	10 52.7	26	19 5 22.61	0.386	22 27 24.7	0.85	8 43.7
27	19 12 19.97	0.730	22 13 3.3	1.50	10 48.5	27	19 5 13.53	0.371	22 27 44.7	0.82	8 39.6
28	19 12 2.53	0.723	22 13 39.1	1.48	10 44.3	28	19 5 4.81	0.356	22 28 4.1	0.80	8 35.6
29	19 11 45.25	0.716	22 14 14.5	1.46	10 40.1	29	19 4 56.46	0.340	22 28 22.9	0.77	8 31.5
30	19 11 28.14	0.709	22 14 49.4	1.45	10 35.9	30	19 4 48.49	0.324	22 28 41.1	0.75	8 27.4
31	19 11 11.22	0.701	22 15 23.9	1.43	10 31.7	31	19 4 40.91	0.308	22 28 58.7	0.72	8 23.4
32	19 10 54.50	-0.692	22 15 58.0	-1.41	10 27.5	32	19 4 33.73	-0.291	22 29 15.6	-0.69	8 19.3
Day of the Month,						Day of the Month,					
		1st.	11th.	21st.	31st.			1st.	11th.	21st.	31st.
Polar Semidiameter		8".7	8".7	8".7	8".6	Polar Semidiameter		8".6	8".5	8".4	8".3
Horizontal Parallax		1.0	1.0	1.0	1.0	Horizontal Parallax		1.0	1.0	1.0	0.9

+ prefixed to the hourly change of declination, indicates that north declinations are increasing, and south declinations are decreasing; - indicates that north declinations are decreasing, south declinations increasing.

## GREENWICH MEAN TIME.

SEPTEMBER.						OCTOBER.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
1	19 4 33.73	-0.291	22 29 15.6	-0.69	8 19.3	1	19 4 10.02	+0.231	22 32 40.5	+0.13	6 21.0
2	19 4 26.94	0.275	22 29 31.8	0.66	8 15.3	2	19 4 15.79	0.249	22 32 37.1	0.16	6 17.2
3	19 4 20.54	0.258	22 29 47.4	0.64	8 11.2	3	19 4 21.98	0.267	22 32 33.0	0.19	6 13.4
4	19 4 14.54	0.241	22 30 2.3	0.61	8 7.2	4	19 4 28.59	0.284	22 32 28.2	0.21	6 9.6
5	19 4 8.95	0.225	22 30 16.6	0.58	8 3.2	5	19 4 35.62	0.302	22 32 22.7	0.24	6 5.7
6	19 4 3.76	0.208	22 30 30.3	0.56	7 59.2	6	19 4 43.07	0.319	22 32 16.5	0.27	6 1.9
7	19 3 58.97	0.191	22 30 43.4	0.53	7 55.2	7	19 4 50.93	0.336	22 32 9.6	0.30	5 58.1
8	19 3 54.59	0.174	22 30 55.8	0.50	7 51.2	8	19 4 59.21	0.354	22 32 2.1	0.33	5 54.3
9	19 3 50.63	0.156	22 31 7.6	0.48	7 47.2	9	19 5 7.90	0.370	22 31 53.9	0.36	5 50.6
10	19 3 47.09	0.139	22 31 18.8	0.45	7 43.2	10	19 5 16.99	0.387	22 31 44.9	0.39	5 46.8
11	19 3 43.97	0.121	22 31 29.3	0.42	7 39.2	11	19 5 26.49	0.404	22 31 35.2	0.42	5 43.0
12	19 3 41.27	0.104	22 31 39.1	0.39	7 35.2	12	19 5 36.40	0.421	22 31 24.9	0.44	5 39.2
13	19 3 38.98	0.087	22 31 48.2	0.37	7 31.3	13	19 5 46.72	0.438	22 31 14.0	0.47	5 35.5
14	19 3 37.11	0.069	22 31 56.7	0.34	7 27.3	14	19 5 57.44	0.455	22 31 2.4	0.50	5 31.7
15	19 3 35.66	0.052	22 32 4.6	0.31	7 23.4	15	19 6 8.55	0.471	22 30 50.1	0.53	5 28.0
16	19 3 34.63	0.034	22 32 11.8	0.29	7 19.4	16	19 6 20.05	0.487	22 30 37.0	0.56	5 24.2
17	19 3 34.02	-0.017	22 32 18.4	0.26	7 15.5	17	19 6 31.93	0.503	22 30 23.2	0.59	5 20.5
18	19 3 33.82	0.000	22 32 24.3	0.23	7 11.5	18	19 6 44.20	0.519	22 30 8.7	0.62	5 16.8
19	19 3 34.04	+0.018	22 32 29.5	0.20	7 7.6	19	19 6 56.86	0.535	22 29 53.5	0.65	5 13.1
20	19 3 34.69	0.036	22 32 34.1	0.18	7 3.7	20	19 7 9.90	0.551	22 29 37.6	0.68	5 9.4
21	19 3 35.77	0.054	22 32 38.0	0.15	6 59.8	21	19 7 23.33	0.567	22 29 21.1	0.70	5 5.7
22	19 3 37.28	0.072	22 32 41.3	0.12	6 55.9	22	19 7 37.14	0.583	22 29 3.9	0.73	5 2.0
23	19 3 39.22	0.090	22 32 43.9	0.10	6 52.0	23	19 7 51.32	0.599	22 28 46.0	0.76	4 58.3
24	19 3 41.59	0.108	22 32 45.9	0.07	6 48.1	24	19 8 5.87	0.614	22 28 27.4	0.79	4 54.6
25	19 3 44.38	0.125	22 32 47.2	0.04	6 44.2	25	19 8 20.79	0.629	22 28 8.1	0.82	4 50.9
26	19 3 47.59	0.143	22 32 47.8	-0.01	6 40.3	26	19 8 36.07	0.644	22 27 48.1	0.85	4 47.2
27	19 3 51.22	0.160	22 32 47.7	+0.02	6 36.5	27	19 8 51.71	0.659	22 27 27.3	0.88	4 43.5
28	19 3 55.28	0.178	22 32 46.9	0.05	6 32.6	28	19 9 7.72	0.675	22 27 5.8	0.91	4 39.9
29	19 3 59.77	0.196	22 32 45.4	0.07	6 28.7	29	19 9 24.09	0.689	22 26 43.6	0.94	4 36.2
30	19 4 4.68	0.214	22 32 43.3	0.10	6 24.9	30	19 9 40.81	0.704	22 26 20.7	0.97	4 32.6
31	19 4 10.02	0.231	22 32 40.5	0.13	6 21.0	31	19 9 57.87	0.718	22 25 57.1	1.00	4 28.9
32	19 4 15.79	+0.249	22 32 37.1	+0.16	6 17.2	32	19 10 15.28	+0.733	22 25 32.8	+1.03	4 25.3
Day of the Month,						Day of the Month,					
1st.						1st.					
11th.						11th.					
21st.						21st.					
31st.						31st.					
Polar Semidiameter 8.3						Polar Semidiameter 7.9					
Horizontal Parallax 0.9						Horizontal Parallax 0.9					

NOTE.—North declinations are marked +, south declinations —.

## GREENWICH MEAN TIME.

NOVEMBER.						DECEMBER.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Dec. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
1	19 10 15.28	+0.733	22 25 32.8	+1.03	4 25.3	1	19 21 17.19	+1.078	22 7 55.0	+1.90	2 38.3
2	19 10 33.04	0.747	22 25 7.8	1.06	4 21.6	2	19 21 43.17	1.087	22 7 9.0	1.93	2 34.8
3	19 10 51.15	0.761	22 24 42.1	1.09	4 18.0	3	19 22 9.36	1.095	22 6 22.3	1.96	2 31.3
4	19 11 9.50	0.775	22 24 15.7	1.11	4 14.4	4	19 22 35.75	1.104	22 5 34.9	1.99	2 27.8
5	19 11 28.35	0.788	22 23 48.6	1.15	4 10.7	5	19 23 2.33	1.111	22 4 46.8	2.02	2 24.3
6	19 11 47.43	0.801	22 23 20.7	1.18	4 7.1	6	19 23 29.10	1.119	22 3 58.1	2.04	2 20.8
7	19 12 6.82	0.815	22 22 52.1	1.21	4 3.5	7	19 23 56.06	1.127	22 3 8.7	2.07	2 17.4
8	19 12 26.53	0.828	22 22 22.8	1.24	3 59.9	8	19 24 23.20	1.134	22 2 18.7	2.10	2 13.9
9	19 12 46.55	0.841	22 21 52.8	1.26	3 56.3	9	19 24 50.50	1.141	22 1 28.0	2.12	2 10.4
10	19 13 6.88	0.854	22 21 22.1	1.29	3 52.7	10	19 25 17.96	1.148	22 0 36.7	2.15	2 6.9
11	19 13 27.52	0.866	22 20 50.7	1.32	3 49.1	11	19 25 45.58	1.154	21 59 44.7	2.18	2 3.4
12	19 13 48.47	0.879	22 20 18.6	1.35	3 45.5	12	19 26 13.36	1.161	21 58 52.1	2.20	2 0.0
13	19 14 9.71	0.891	22 19 45.8	1.38	3 42.0	13	19 26 41.29	1.167	21 57 58.9	2.23	1 56.5
14	19 14 31.23	0.902	22 19 12.3	1.41	3 38.4	14	19 27 9.36	1.173	21 57 5.1	2.25	1 53.0
15	19 14 53.03	0.914	22 18 38.1	1.44	3 34.8	15	19 27 37.58	1.179	21 56 10.7	2.28	1 49.6
16	19 15 15.11	0.926	22 18 3.1	1.47	3 31.3	16	19 28 5.95	1.185	21 55 15.6	2.31	1 46.1
17	19 15 37.47	0.938	22 17 27.4	1.50	3 27.7	17	19 28 34.46	1.190	21 54 19.9	2.33	1 42.6
18	19 16 0.11	0.949	22 16 51.0	1.53	3 24.1	18	19 29 3.09	1.195	21 53 23.7	2.35	1 39.2
19	19 16 23.01	0.960	22 16 13.9	1.56	3 20.6	19	19 29 31.84	1.200	21 52 26.9	2.38	1 35.7
20	19 16 46.17	0.970	22 15 36.1	1.59	3 17.0	20	19 30 0.71	1.205	21 51 29.5	2.40	1 32.3
21	19 17 9.59	0.981	22 14 57.7	1.61	3 13.5	21	19 30 29.69	1.210	21 50 31.5	2.43	1 28.8
22	19 17 33.27	0.992	22 14 18.6	1.64	3 10.0	22	19 30 58.78	1.214	21 49 33.0	2.45	1 25.4
23	19 17 57.20	1.002	22 13 38.8	1.67	3 6.4	23	19 31 27.98	1.219	21 48 33.9	2.47	1 21.9
24	19 18 21.38	1.013	22 12 58.3	1.70	3 2.9	24	19 31 57.28	1.223	21 47 34.3	2.50	1 18.5
25	19 18 45.80	1.023	22 12 17.1	1.73	2 59.4	25	19 32 26.68	1.227	21 46 34.1	2.52	1 15.0
26	19 19 10.46	1.033	22 11 35.1	1.76	2 55.9	26	19 32 56.17	1.230	21 45 33.3	2.54	1 11.6
27	19 19 35.36	1.042	22 10 52.4	1.79	2 52.3	27	19 33 25.74	1.233	21 44 32.0	2.56	1 8.1
28	19 20 0.49	1.052	22 10 9.1	1.82	2 48.8	28	19 33 55.38	1.237	21 43 30.2	2.59	1 4.7
29	19 20 25.84	1.061	22 9 25.1	1.85	2 45.3	29	19 34 25.10	1.240	21 42 27.9	2.61	1 1.3
30	19 20 51.41	1.070	22 8 40.4	1.88	2 41.8	30	19 34 54.90	1.243	21 41 25.1	2.63	0 57.8
31	19 21 17.19	1.078	22 7 55.0	1.90	2 38.3	31	19 35 24.77	1.246	21 40 21.7	2.65	0 54.4
32	19 21 43.17	+1.087	22 7 9.0	+1.93	2 34.8	32	19 35 54.69	+1.248	21 39 17.8	+2.67	0 51.0
Day of the Month,						Day of the Month,					
		1st.	11th.	21st.	31st.			1st.	11th.	21st.	31st.
Polar Semidiameter		7 <sup>5</sup>	7 <sup>4</sup>	7 <sup>3</sup>	7 <sup>3</sup>	Polar Semidiameter		7 <sup>3</sup>	7 <sup>2</sup>	7 <sup>1</sup>	7 <sup>1</sup>
Horizontal Parallax		0.9	0.8	0.8	0.8	Horizontal Parallax		0.8	0.8	0.8	0.8

+ prefixed to the hourly change of declination, indicates that north declinations are increasing, and south declinations are decreasing; - indicates that north declinations are decreasing, south declinations increasing.



# 242 SUN'S COÖRDINATES, 1872.

Greenwich Mean Noon.		X.	Y.	Z.	Greenwich Mean Noon.		X.	Y.	Z.		
Jan.	0	0	+1611103	-8897780	-3860731	Mar.	1	61	+9389808	-2022033	-1267890
	1	1	.1783385	.8870096	.3848719		2	62	.9446546	.2771660	.1202648
	2	2	.1955129	.8839651	.3835509		3	63	.9500424	.2620431	.1137037
	3	3	.2126282	.8806451	.3821105		4	64	.9551424	.2468393	.1071075
	4	4	.2296788	.8770505	.3805513		5	65	.9599530	.2315595	.1004781
	5	5	+2466593	-.8731821	-.3788736		6	66	+9644726	-.2162082	-.0938174
	6	6	.2635642	.8690411	.3770776		7	67	.9686995	.2007901	.0871276
	7	7	.2803879	.8646286	.3751637		8	68	.9726325	.1853104	.0804111
	8	8	.2971249	.8599456	.3731324		9	69	.9762705	.1697741	.0736689
	9	9	.3137698	.8549934	.3709844		10	70	.9796124	.1541864	.0669063
	10	10	+3303170	-.8497737	-.3687204		11	71	+9826573	-.1385523	-.0601224
	11	11	.3467608	.8442883	.3663409		12	72	.9854045	.1228770	.0533204
	12	12	.3630956	.8385387	.3638467		13	73	.9878537	.1071656	.0465025
	13	13	.3793165	.8325271	.3612388		14	74	.9900047	.0914233	.0396711
	14	14	.3954182	.8265260	.3585182		15	75	.9918574	.0756548	.0328283
	15	15	+4113955	-.8197277	-.3556859		16	76	+9934117	-.0598647	-.0259761
	16	16	.4272434	.8129447	.3527428		17	77	.9946677	.0440578	.0191167
	17	17	.4429568	.8059093	.3496899		18	78	.9956256	.0282390	.0122522
	18	18	.4585310	.7986241	.3465284		19	79	.9962858	-.0124132	-.0053846
	19	19	.4739613	.7910916	.3432595		20	80	.9966486	+0034151	+0014840
	20	20	+4892431	-.7833145	-.3398843		21	81	+9967144	+0192413	+0083515
	21	21	.5043722	.7752953	.3364041		22	82	.9964839	.0350606	.0152159
	22	22	.5193442	.7670365	.3328199		23	83	.9959579	.0508688	.0220753
	23	23	.5341550	.7585409	.3291331		24	84	.9951366	.0666618	.0281279
	24	24	.5488003	.7498115	.3253449		25	85	.9940204	.0824351	.0357719
Feb.	25	25	+5632760	-.7408510	-.3214566		26	86	+9926098	+00981844	+0426055
	26	26	.5775779	.7316622	.3174692		27	87	.9909054	.1139053	.0404265
	27	27	.5917020	.7222477	.3133840		28	88	.9889078	.1295934	.0562331
	28	28	.6056444	.7126103	.3092022		29	89	.9866176	.1452444	.0630235
	29	29	.6194009	.7027527	.3049251		30	90	.9840355	.1618538	.0697959
	30	30	+6329672	-.6926778	-.3005538	Apr.	31	91	+9811621	+1764162	+0765483
	31	31	.6463393	.6823882	.2960894		1	92	.9779981	.1919289	.0832787
	1	32	.6595132	.6718867	.2915333		2	93	.9745440	.2073856	.0899850
	2	33	.6724844	.6611764	.2868866		3	94	.9708010	.2227826	.0966653
	3	34	.6852489	.6502603	.2821508		4	95	.9667703	.2381148	.1033177
	4	35	+6978025	-.6391422	-.2773274		5	96	+9624529	+2533774	+1099401
	5	36	.7101412	.6278258	.2724178		6	97	.9578502	.2685659	.1165335
	6	37	.7222607	.6163143	.2674236		7	98	.9529639	.2836753	.1230867
	7	38	.7341571	.6046112	.2623463		8	99	.9477957	.2987007	.1296068
	8	39	.7458266	.5927203	.2571875		9	100	.9423472	.3136377	.1360887
	9	40	+7572654	-.5806457	-.2519489		10	101	+9366204	+3284817	+1425304
	10	41	.7684697	-.5683915	-.2466321		11	102	.9306174	.3432281	.1489297
	11	42	.7794360	.5559619	.2412390		12	103	.9243407	.3578726	.1552846
	12	43	.7901610	.5433613	.2357714		13	104	.9177928	.3724108	.1615934
	13	44	.8006416	.5305941	.2302314		14	105	.9109762	.3868381	.1678542
	14	45	+8108747	-.5176644	-.2246209		15	106	+9038935	+4011507	+1740654
	15	46	.8208574	.5045766	.2189416		16	107	.8965472	.4153450	.1802251
	16	47	.8305870	.4913351	.2131955		17	108	.8889399	.4294172	.1863316
	17	48	.8400612	.4779442	.2073844		18	109	.8810742	.4433631	.1923831
	18	49	.8492776	.4644082	.2015104		19	110	.8729529	.4571791	.1983781
	19	50	+8582336	-.4507315	-.1955752		20	111	+8645790	+4708616	+2043150
	20	51	.8669271	.4369183	.1895809		21	112	.8559552	.4844070	.2101921
	21	52	.8753561	.4229728	.1835295		22	113	.8470840	.4978117	.2160080
	22	53	.8835184	.4088994	.1774229		23	114	.8379680	.5110723	.2217613
	23	54	.8914121	.3947023	.1712625		24	115	.8286100	.5241854	.2274507
	24	55	+8990352	-.3803856	-.1650501		25	116	+8190125	+5371479	+2330747
	25	56	.9063857	.3659533	.1587877		26	117	.8091779	.5495663	.2386318
	26	57	.9134616	.3514093	.1524771		27	118	.7991091	.5626069	.2441204
	27	58	.9202611	.3367580	.1461201		28	119	.7888091	.5750961	.2495389
	28	59	.9267822	.3220038	.1397185		29	120	.7782806	.5874202	.2548850
	29	60	+9330228	-.3071507	-.1332742		30	121	+7675262	+5095758	+2601508
	30	61	+9389808	-.2922033	-.1267890		31	122	+7565492	+6115592	+2653592

# SUN'S COÖRDINATES, 1872: 243

Greenwich Mean Noon.			X.	Y.	Z.	Greenwich Mean Noon.			X.	Y.	Z.
May	1	<sup>d</sup> 122	+7565492	+6115592	+2653592	July	1	<sup>d</sup> 183	-1743863	+9189390	+3987353
	2	123	.7453527	.6233669	.2704825		2	184	.1910334	.9161551	.3975280
	3	124	.7339397	.6349952	.2755281		3	185	.2076275	.9131120	.3962083
	4	125	.7223134	.6464407	.2804946		4	186	.2241636	.9098103	.3947766
	5	126	.7104775	.6577000	.2853804		5	187	.2406368	.9062512	.3932331
	6	127	+6984355	+6687697	+2901840		6	188	-.2570422	+9024355	+3915780
	7	128	.6861911	.6796462	.2949039		7	189	.2733748	.8983644	.3898119
	8	129	.6737483	.6903260	.2995386		8	190	.2896295	.8940392	.3879354
	9	130	.6611110	.7008062	.3040868		9	191	.3058013	.8894611	.3859492
	10	131	.6482835	.7110841	.3085471		10	192	.3218856	.8846318	.3838539
	11	132	+6352700	+7211566	+3129181		11	193	-.3378775	+8795531	+3816501
	12	133	.6220746	.7309208	.3171987		12	194	.3537724	.8742266	.3793386
	13	134	.6087016	.7406742	.3213878		13	195	.3695660	.8686542	.3769203
	14	135	.5951553	.7501142	.3254843		14	196	.3852541	.8628376	.3743960
	15	136	.5814399	.7593388	.3294872		15	197	.4008325	.8567786	.3717665
	16	137	+5675595	+7683457	+3333955		16	198	-.4162969	+8504791	+3690326
	17	138	.5535181	.7771327	.3372082		17	199	.4316432	.8439413	.3661952
	18	139	.5393201	.7856977	.3409244		18	200	.4468675	.8371671	.3632551
	19	140	.5249698	.7940387	.3445433		19	201	.4619658	.8301582	.3602132
	20	141	.5104712	.8021538	.3480641		20	202	.4769342	.8229166	.3570705
	21	142	+4958285	+8100410	+3514860		21	203	-.4917688	+8154441	+3538278
	22	143	.4810457	.8176987	.3548980		22	204	.5064654	.8077426	.3504859
	23	144	.4661268	.8251249	.3580294		23	205	.5210202	.7998138	.3470456
	24	145	.4510757	.8323176	.3611495		24	206	.5354294	.7916597	.3435076
	25	146	.4358965	.8392749	.3641675		25	207	.5496892	.7832822	.3398728
	26	147	+4205932	+8459950	+3670828		26	208	-.5637953	+7746832	+3361422
	27	148	.4051696	.8524761	.3698946		27	209	.5777435	.7658646	.3323164
	28	149	.3896298	.8587163	.3726020		28	210	.5915296	.7568288	.3283963
	29	150	.3739783	.8647137	.3752041		29	211	.6051495	.7475780	.3243830
	30	151	.3582193	.8704664	.3777001		30	212	.6185990	.7381144	.3202774
June	31	152	+3423570	+8759725	+3800893	Aug.	1	213	-.6318740	+7284405	+3160806
	1	153	.3263959	.8812302	.3823709		2	214	.6449702	.7185589	.3117936
	2	154	.3103409	.8862377	.3845441		3	215	.6578836	.7084724	.3074176
	3	155	.2941967	.8909933	.3866082		4	216	.6706100	.6981836	.3029537
	4	156	.2779679	.8954955	.3885625		5	217	.6831455	.6876955	.2994032
	5	157	+2616595	+8997432	+3904063		6	218	-.6954861	+6770113	+2937675
	6	158	.2452763	.9037347	.3921390		7	219	.7076279	.6661344	.2890481
	7	159	.2288231	.9074692	.3937631		8	220	.7195673	.6550681	.2842463
	8	160	.2123050	.9109459	.3952632		9	221	.7313007	.6438155	.2793634
	9	161	.1957274	.9141638	.3966659		10	222	.7422246	.6323801	.2744009
	10	162	+1790953	+9171222	+3979499		11	223	-.7541355	+6207653	+2693604
	11	163	.1624137	.9198293	.3991210		12	224	.7652335	.6089744	.2642436
	12	164	.1456876	.9222578	.4001788		13	225	.7761067	.5970111	.2590522
	13	165	.1289218	.9244344	.4011232		14	226	.7867611	.5848792	.2537876
	14	166	.1121212	.9263498	.4019541		15	227	.7971908	.5725823	.2484513
	15	167	+0952905	+9280040	+4026715		16	228	-.8073931	+5671238	+2430448
	16	168	.0784346	.9293069	.4032754		17	229	.8173654	.5475069	.2375696
	17	169	.0615580	.9305285	.4037658		18	230	.8271051	.5347351	.2320273
	18	170	.0446651	.9313987	.4041428		19	231	.8366995	.5218117	.2264194
	19	171	.0277504	.9320075	.4044063		20	232	.8458761	.5088701	.2207475
	20	172	+0108484	+9323548	+4045564		21	233	-.8549021	+4955237	+2150129
	21	173	-.0060665	.9324411	.4045933		22	234	.8636849	.4821658	.2092170
	22	174	.0229799	.9322661	.4045169		23	235	.8722221	.4686697	.2033612
	23	175	.0398872	.9318298	.4043272		24	236	.8805111	.4550391	.1974471
	24	176	.0567841	.9311322	.4040242		25	237	.8885480	.4412775	.1914764
	25	177	-.0736662	+9301733	+4036979		26	238	-.8963320	+4273884	+1854505
	26	178	.0905287	.9289533	.4030784		27	239	.9038618	.4133755	.1793709
	27	179	.1073671	.9274722	.4024359		28	240	.9111310	.3992426	.1732391
	28	180	.1241769	.9257300	.4016803		29	241	.9181378	.3849935	.1670569
	29	181	.1409533	.9237269	.4008116		30	242	.9248814	.3706321	.1608259
	30	182	-.1576913	+9214631	+3998299		31	243	-.9313584	+3561627	+1545478
	31	183	-.1743863	+9189390	+3987353		31	244	-.9377661	+3415897	+1482245

# 244 SUN'S COÖRDINATES, 1872.

Greenwich Mean Noon.		X.	Y.	Z.	Greenwich Mean Noon.		X.	Y.	Z.
Sept. 1	<sup>d</sup> 245	-.9435031	+3269170	+1418580	Nov. 1	<sup>d</sup> 306	-.7662961	-.5775786	-.2506206
	246	.9491662	.3121490	.1354501		2 307	.7541630	.5896400	.2558551
	3 247	.9545537	.2972902	.1290027		3 308	.7434117	.6015212	.2610113
	4 248	.9596638	.2823452	.1225178		4 309	.7316280	.6132181	.2660875
	5 249	.9644949	.2673188	.1159973		5 310	.7196217	.6247271	.2716820
	6 250	-.9690453	+2522156	+1094433		6 311	-.7073968	-.6360444	-.2759933
	7 251	.9733136	.2370402	.1028577		7 312	.6949573	.6471665	.2808197
	8 252	.9772988	.2217970	.0962426		8 313	.6823071	.6580902	.2855598
	9 253	.9809997	.2064908	.0896002		9 314	.6694499	.6688122	.2902124
	10 254	.9844152	.1911260	.0829325		10 315	.6563898	.6793296	.2947760
	11 255	-.9875446	+1757069	+0762414		11 316	-.6431309	-.6896394	-.2992493
	12 256	.9903871	.1602381	.0695287		12 317	.6296771	.6997384	.3036311
	13 257	.9929419	.1447240	.0627964		13 318	.6160323	.7086238	.3079202
	14 258	.9952082	.1291691	.0560465		14 319	.6022005	.7192128	.3121152
	15 259	.9971856	.1135776	.0492309		15 320	.5881856	.7287424	.3162145
Oct. 1	260	-.9988736	+0979539	+0425014	Dec. 1	321	-.5739914	-.7379697	-.3202177
	261	1.0002717	.0823022	.0357099		17 322	.5596220	.7469721	.3241234
	18 262	1.0013793	.0666267	.0290082		18 323	.5450812	.7557466	.3279392
	19 263	1.0021958	.0509314	.0220981		19 324	.5303730	.7642906	.3316370
	20 264	1.0027204	.0352205	.0152814		20 325	.5155015	.7726014	.3352425
	21 265	-1.0029526	+0194984	+0084600		21 326	-.5004708	-.7806759	-.3387456
	22 266	1.0028919	+0037697	+0016357		22 327	.4852852	.7885114	.3421452
	23 267	1.0025379	-.0119614	-.0051895		23 328	.4699489	.7961051	.3454402
	24 268	1.0018901	.0276903	.0120138		24 329	.4544663	.8034543	.3486293
	25 269	1.0009481	.0434124	.0188353		25 330	.4388421	.8105563	.3517114
	26 270	-.9997114	-.0591231	-.0256521		26 331	-.4230811	-.8174083	-.3546851
	27 271	.9981800	.0748178	.0324621		27 332	.4071881	.8240078	.3575492
	28 272	.9963537	.0904917	.0392632		28 333	.3911679	.8303524	.3603027
	29 273	.9942324	.1061400	.0460532		29 334	.3750258	.8364397	.3629447
	30 274	.9918162	.1217576	.0528298		30 335	.3587670	.8422674	.3654741
Oct. 1	275	-.9891055	-.1373395	-.0595911	Dec. 1	336	-.3423966	-.8478334	-.3678900
	2 276	.9861007	.1528808	.0663351		2 337	.3259201	.8531359	.3701916
	3 277	.9828025	.1683767	.0730596		3 338	.3093431	.8581731	.3723779
	4 278	.9792117	.1838223	.0797623		4 339	.2926710	.8629436	.3744481
	5 279	.9753293	.1992123	.0864411		5 340	.2759089	.8674459	.3764016
	6 280	-.9711566	-.2145420	-.0930937		6 341	-.2590624	-.8716786	-.3782382
	7 281	.9666947	.2298068	.0997180		7 342	.2421372	.8756404	.3799573
	8 282	.9619453	.2453002	.1063120		8 343	.2251385	.8793301	.3815584
	9 283	.9569102	.2601226	.1128738		9 344	.2080715	.8827471	.3830410
	10 284	.9515908	.2751646	.1194013		10 345	.1909415	.8858909	.3844047
	11 285	-.9459884	-.2901230	-.1258925		11 346	-.1737539	-.8887696	-.3856492
	12 286	.9401048	.3049938	.1323455		12 347	.1565140	.8913552	.3867743
	13 287	.9339419	.3197728	.1387584		13 348	.1392268	.8936740	.3877799
	14 288	.9275015	.3344558	.1451295		14 349	.1218973	.8957166	.3886657
	15 289	.9207853	.3490388	.1514570		15 350	.1045304	.8974826	.3894314
Oct. 1	290	-.9137952	-.3635175	-.1577392	Dec. 1	351	-.0871309	-.8989708	-.3900767
	17 291	.9065331	.3778878	.1639742		17 352	.0697039	.9001814	.3906114
	18 292	.8990007	.3921455	.1701692		18 353	.0522546	.9011136	.3910055
	19 293	.8911907	.4062864	.1762954		19 354	.0347881	.9017667	.3912887
	20 294	.8831320	.4203065	.1823782		20 355	-.0173095	.9021402	.3914537
	21 295	-.8747996	-.4342017	-.1884070		21 356	+0.0001769	-.9022338	-.3914914
	22 296	.8662046	.4479677	.1943798		22 357	.0176630	.9020470	.3914105
	23 297	.8573487	.4616104	.2002948		23 358	.0351461	.9015794	.3912080
	24 298	.8482340	.4750957	.2061502		24 359	.0526198	.9008309	.3908339
	25 299	.8388629	.4884490	.2119441		25 360	.0700786	.8998013	.3904380
	26 300	-.8292376	-.5016557	-.2176746		26 361	+0.0875168	-.8984909	-.3898702
	27 301	.8193605	.5147115	.2233398		27 362	.1049288	.8968998	.3891804
	28 302	.8092343	.5276121	.2290377		28 363	.1223089	.8950281	.3883689
	29 303	.7988618	.5403534	.2344665		29 364	.1396513	.8928763	.3874359
	30 304	.7882459	.5529313	.2399245		30 365	.1569503	.8904450	.3863815
Oct. 1	31 305	-.7773896	-.5652411	-.2453098	Dec. 1	366	+1.1742001	-.8877353	-.3852061
	32 306	-.7662961	-.5775786	-.2506206		32 367	+1.1913950	-.8847479	-.3839101

# MOON'S LONGITUDE, &c., 1872. 245

## FOR GREENWICH MEAN NOON AND MIDNIGHT.

Day of Month.	JANUARY.		FEBRUARY.		MARCH.	
	True Longitude.	Latitude.	True Longitude.	Latitude.	True Longitude.	Latitude.
1.0	162° 0' 59.2	+5° 11' 20.2	210° 28' 41.6	+3° 55' 23.5	234° 27' 21.0	+1° 59' 4.4
1.5	168 16 4.0	5 15 11.8	217 11 9.7	3 30 37.4	241 19 12.3	1 24 56.0
2.0	174 35 11.0	5 15 18.0	223 58 11.7	3 2 37.1	248 14 3.8	0 49 17.0
2.5	180 58 45.1	5 11 31.2	230 50 0.0	2 31 39.7	255 11 59.5	+0 12 37.9
3.0	187 27 10.8	5 3 45.4	237 46 44.1	1 58 6.3	262 13 1.6	-0 24 28.8
3.5	194 0 51.9	4 51 56.8	244 48 29.2	1 22 22.3	269 17 9.2	1 1 28.6
4.0	200 40 10.0	4 36 4.2	251 55 14.9	0 44 57.6	276 24 17.0	1 37 45.3
4.5	207 25 24.0	4 16 9.6	259 6 53.6	+0 6 26.1	283 34 14.1	2 12 42.1
5.0	214 16 48.6	3 52 18.5	266 23 9.2	-0 32 34.2	290 46 43.1	2 45 42.2
5.5	221 14 32.5	3 24 41.1	273 43 36.3	1 11 22.0	298 1 19.6	3 16 9.7
6.0	228 18 38.0	2 53 32.8	281 7 39.7	1 49 14.0	305 17 31.6	3 43 30.9
6.5	235 28 58.3	2 19 14.8	288 34 34.3	2 25 25.8	312 34 40.3	4 7 15.3
7.0	242 45 17.5	1 42 14.4	296 3 26.0	2 59 14.0	319 52 0.4	4 26 56.9
7.5	250 7 9.1	1 3 5.5	303 33 13.0	3 29 57.9	327 8 41.8	4 42 15.1
8.0	257 33 55.5	+0 22 27.8	311 2 48.0	3 57 1.0	334 23 51.6	4 52 55.6
8.5	265 4 48.6	-0 18 53.8	318 31 1.0	4 19 53.2	341 36 36.1	4 58 51.0
9.0	272 38 50.4	1 0 10.7	325 56 42.1	4 38 11.5	348 46 3.2	5 0 0.7
9.5	280 14 54.5	1 40 32.3	333 18 44.6	4 51 41.2	355 51 25.0	4 56 30.6
10.0	287 51 48.2	2 19 8.5	340 36 8.0	5 0 15.5	2 51 59.3	4 48 32.6
10.5	295 28 15.4	2 55 11.6	347 48 0.4	5 3 55.5	9 47 11.8	4 36 23.8
11.0	303 2 59.3	3 27 58.8	354 53 40.3	5 2 49.4	16 36 36.7	4 20 25.3
11.5	310 34 45.8	3 56 53.9	1 52 37.7	4 57 10.9	23 19 57.9	4 1 0.7
12.0	318 2 26.1	4 21 28.7	8 44 34.3	4 47 18.3	29 57 8.4	3 38 35.6
12.5	325 24 59.9	4 41 23.6	15 29 23.2	4 33 33.0	36 28 10.6	3 13 36.3
13.0	332 41 37.1	4 56 27.2	22 7 8.6	4 16 18.5	42 53 15.0	2 46 29.1
13.5	339 51 39.2	5 6 36.4	28 38 3.8	3 55 59.0	49 12 39.8	2 17 39.3
14.0	346 54 40.0	5 11 55.0	35 2 30.2	3 32 59.0	55 26 49.5	1 47 31.4
14.5	353 50 25.7	5 12 32.3	41 20 55.9	3 7 42.3	61 36 13.7	1 16 28.6
15.0	0 38 53.1	5 8 42.5	47 33 54.2	2 40 31.8	67 41 26.5	0 44 52.3
15.5	7 20 9.6	5 0 42.4	53 42 1.9	2 11 49.7	73 43 5.2	-0 13 2.9
16.0	13 54 31.2	4 48 51.4	59 45 58.8	1 41 56.7	79 41 49.5	+0 18 40.8
16.5	20 22 20.6	4 33 29.9	65 46 26.0	1 11 12.6	85 38 20.5	0 50 0.9
17.0	26 44 6.2	4 14 58.6	71 44 5.3	0 39 56.3	91 33 20.0	1 20 40.5
17.5	33 0 20.1	3 53 38.5	77 39 38.3	-0 8 25.9	97 27 29.9	1 50 23.4
18.0	39 11 37.3	3 29 50.3	83 33 45.7	+0 23 1.1	103 21 31.5	2 18 53.7
18.5	45 18 34.5	3 3 54.0	89 27 6.7	0 54 7.5	109 16 4.7	2 45 55.9
19.0	51 21 49.0	2 36 9.4	95 20 18.6	1 24 36.3	115 11 47.4	3 11 14.7
19.5	57 21 57.9	2 6 55.7	101 13 56.1	1 54 10.5	121 9 15.3	3 34 34.6
20.0	63 19 37.5	1 36 31.7	107 8 31.1	2 22 33.3	127 9 1.1	3 55 40.2
20.5	69 15 22.6	1 5 15.9	113 4 32.1	2 49 27.6	133 11 34.4	4 14 16.2
21.0	75 9 46.6	0 33 26.7	119 2 24.6	3 14 36.3	139 17 20.5	4 30 7.4
21.5	81 3 20.4	-0 1 22.3	125 2 30.2	3 37 42.4	145 26 40.6	4 42 59.0
22.0	86 56 32.6	+0 30 38.8	131 5 7.0	3 58 29.3	151 39 51.2	4 52 37.1
22.5	92 49 49.1	1 2 18.2	137 10 29.2	4 16 40.7	157 57 4.0	4 58 49.0
23.0	98 43 33.3	1 33 17.4	143 18 47.4	4 32 1.1	164 18 25.7	5 1 23.3
23.5	104 38 6.0	2 3 17.9	149 30 8.5	4 44 15.9	170 43 57.9	5 0 10.8
24.0	110 33 45.5	2 32 1.3	155 44 36.3	4 53 12.2	177 13 37.1	4 55 5.2
24.5	116 30 47.7	2 59 9.3	162 2 11.6	4 58 38.7	183 47 15.2	4 46 2.9
25.0	122 20 26.4	3 24 24.1	168 22 52.9	5 0 26.5	190 24 40.3	4 33 4.5
25.5	128 29 53.4	3 47 28.2	174 46 36.9	4 58 29.0	197 5 37.1	4 16 14.2
26.0	134 32 18.8	4 8 5.2	181 13 19.1	4 52 42.4	203 49 48.5	3 55 40.6
26.5	140 36 51.7	4 25 59.4	187 42 54.9	4 43 6.1	210 36 55.7	3 31 36.6
27.0	146 43 40.3	4 40 56.4	194 15 19.8	4 29 42.5	217 26 40.0	3 4 19.4
27.5	152 52 52.3	4 52 43.2	200 50 30.2	4 12 37.4	224 18 43.2	2 34 10.3
28.0	159 4 35.4	5 1 8.3	207 28 23.7	3 52 0.0	231 12 48.1	2 1 34.2
28.5	165 18 57.9	5 6 2.0	214 8 59.6	3 28 2.7	238 8 39.6	1 26 59.2
29.0	171 36 8.6	5 7 16.6	220 52 19.1	3 1 1.2	245 6 4.9	0 50 56.2
29.5	177 56 17.3	5 4 46.4	227 38 24.9	2 31 14.4	252 4 53.4	+0 13 58.0
30.0	184 19 35.2	4 58 27.8	234 27 21.0	1 59 4.4	259 4 56.1	-0 23 21.3
30.5	190 46 14.7	4 48 19.6	241 19 12.3	1 24 56.0	266 6 5.9	1 0 26.5
31.0	197 16 29.2	4 34 23.0	248 14 3.8	0 49 17.0	273 8 16.6	1 36 42.5
31.5	203 50 33.1	+4 16 42.0	255 11 59.5	+0 12 37.9	280 11 22.1	-2 11 34.9

# 246 MOON'S LONGITUDE, &c., 1872.

FOR GREENWICH MEAN NOON AND MIDNIGHT.

Day of Month.	APRIL.		MAY.		JUNE.	
	True Longitude.	Latitude.	True Longitude.	Latitude.	True Longitude.	Latitude.
1.0	287° 15' 15.5"	-2° 44' 30.1"	326° 25' 42.6"	-4° 59' 38.8"	17° 33' 49.6"	-4° 20' 17.5"
1.5	294 19 48.6	3 14 56.2	333 22 56.5	5 8 12.1	24 3 7.5	3 58 8.2
2.0	301 24 50.7	3 42 23.8	340 17 38.0	5 12 13.2	30 28 38.0	3 33 10.8
2.5	308 30 8.3	4 6 26.2	347 9 37.8	5 11 43.5	36 50 32.8	3 5 47.8
3.0	315 35 24.6	4 26 40.6	353 58 46.6	5 6 48.7	43 9 3.7	2 36 22.6
3.5	322 40 19.1	4 42 47.8	0 44 55.1	4 57 38.5	49 24 22.6	2 5 18.9
4.0	329 44 27.8	4 54 33.5	7 27 54.2	4 44 26.0	55 36 41.2	1 33 0.6
4.5	336 47 23.3	5 1 48.3	14 7 35.5	4 27 27.5	61 46 11.6	0 59 51.4
5.0	343 48 36.1	5 4 28.0	20 43 51.2	4 7 2.3	67 53 5.8	-0 26 14.6
5.5	350 47 35.3	5 2 33.7	27 16 34.7	3 43 31.7	73 57 36.3	+0 7 26.9
6.0	357 43 49.5	4 56 11.8	33 45 41.3	3 17 19.1	79 59 56.0	0 40 51.2
6.5	4 36 48.6	4 45 33.8	40 11 7.9	2 48 49.0	86 0 18.4	1 13 37.1
7.0	11 26 4.5	4 30 55.3	46 32 54.1	2 18 26.8	91 58 58.2	1 45 24.6
7.5	18 11 12.9	4 12 35.9	52 51 1.8	1 46 38.0	97 56 11.1	2 15 54.8
8.0	24 51 54.1	3 50 58.3	59 5 36.1	1 13 48.0	103 52 14.3	2 44 50.1
8.5	31 27 53.7	3 26 27.2	65 16 45.2	0 40 21.7	109 47 26.4	3 11 54.2
9.0	37 59 3.5	2 59 28.5	71 24 40.3	-0 6 42.9	115 42 7.8	3 36 52.1
9.5	44 25 21.0	2 30 28.8	77 29 35.8	+0 26 45.9	121 36 40.4	3 59 29.9
10.0	50 46 50.2	1 59 54.6	83 31 49.1	0 59 43.2	127 31 27.7	4 19 34.9
10.5	57 3 41.3	1 28 11.8	89 31 40.9	1 31 49.1	133 26 55.4	4 36 55.3
11.0	63 16 9.3	0 55 45.0	95 29 34.4	2 2 45.0	139 23 30.8	4 51 20.4
11.5	69 24 34.8	-0 22 57.5	101 25 55.6	2 32 13.7	145 21 42.4	5 2 40.3
12.0	75 29 22.6	+0 9 48.7	107 21 12.9	2 59 59.4	151 22 0.3	5 10 45.9
12.5	81 31 1.5	0 42 13.5	113 15 56.8	3 25 47.3	157 24 55.6	5 15 28.9
13.0	87 30 3.5	1 13 57.7	119 10 39.7	3 49 23.5	163 31 0.2	5 16 41.8
13.5	93 27 3.4	1 44 43.9	125 5 55.5	4 10 35.0	169 40 46.1	5 14 17.9
14.0	99 22 37.8	2 14 15.7	131 2 19.0	4 29 9.2	175 54 45.2	5 8 11.7
14.5	105 17 24.9	2 42 17.5	137 0 25.8	4 44 54.3	182 13 28.2	4 58 19.0
15.0	111 12 3.9	3 8 34.6	143 0 51.8	4 57 38.8	188 37 24.6	4 44 37.4
15.5	117 7 14.2	3 32 52.6	149 4 12.4	5 7 11.5	195 7 1.0	4 27 6.5
16.0	123 3 34.9	3 54 57.6	155 11 2.1	5 13 21.7	201 42 40.5	4 5 49.1
16.5	129 1 44.4	4 14 35.9	161 21 53.9	5 15 59.5	208 24 41.7	3 40 51.1
17.0	135 2 19.6	4 31 33.9	167 37 18.5	5 14 55.6	215 13 17.3	3 12 22.7
17.5	141 5 55.1	4 45 38.1	173 57 43.9	5 10 2.0	222 8 32.9	2 40 39.0
18.0	147 13 3.0	4 56 35.5	180 23 33.8	5 1 12.3	229 10 25.6	2 6 0.4
18.5	153 24 12.1	5 4 13.3	186 55 7.7	4 48 22.6	236 18 43.6	1 28 53.4
19.0	159 39 47.1	5 8 19.5	193 32 39.2	4 31 31.7	243 33 5.1	0 49 50.5
19.5	166 0 8.3	5 8 43.3	200 16 15.5	4 10 42.1	250 52 57.9	+0 9 29.6
20.0	172 25 30.5	5 5 15.7	207 5 56.7	3 46 0.7	258 17 39.6	-0 31 26.1
20.5	178 56 2.9	4 57 49.8	214 1 34.8	3 17 39.6	265 46 18.8	1 12 9.8
21.0	185 31 48.3	4 46 21.6	221 2 54.1	2 45 56.6	273 17 55.7	1 51 52.8
21.5	192 12 43.0	4 30 50.7	228 9 30.4	2 11 15.4	280 51 24.1	2 29 46.4
22.0	198 58 37.0	4 11 21.1	235 20 51.9	1 34 5.7	288 25 34.2	3 5 4.0
22.5	205 49 13.9	3 48 1.5	242 36 19.8	0 55 2.8	295 59 15.0	3 37 3.4
23.0	212 44 11.8	3 21 5.7	249 55 9.5	+0 14 46.8	303 31 16.8	4 5 8.1
23.5	219 43 3.8	2 50 53.0	257 16 31.7	-0 25 58.6	311 0 33.9	4 28 49.2
24.0	226 45 19.1	2 17 47.9	264 39 34.4	1 6 27.7	318 26 7.3	4 47 45.8
24.5	233 50 24.5	1 42 19.7	272 3 24.3	1 45 54.4	325 47 6.5	5 1 45.3
25.0	240 57 45.4	1 5 2.1	279 27 8.7	2 23 34.1	333 2 51.0	5 10 42.9
25.5	248 6 47.1	+0 26 31.9	286 49 57.3	2 58 45.0	340 12 50.3	5 14 40.8
26.0	255 16 55.9	-0 12 31.7	294 11 3.2	3 30 49.9	347 16 44.7	5 13 47.5
26.5	262 27 39.9	0 51 28.6	301 29 44.4	3 59 17.0	354 14 24.2	5 8 16.2
27.0	269 38 29.9	1 29 38.7	308 45 24.8	4 23 40.8	1 5 47.7	4 58 24.1
27.5	276 48 59.1	2 6 22.8	315 57 34.3	4 43 41.9	7 51 1.4	4 44 31.1
28.0	283 58 44.3	2 41 4.3	323 5 49.1	4 59 7.6	14 30 17.9	4 26 58.8
28.5	291 7 25.1	3 13 9.8	330 9 51.9	5 9 51.0	21 3 54.9	4 6 10.1
29.0	298 14 44.0	3 42 9.4	337 9 31.3	5 15 50.8	27 32 13.6	3 42 28.3
29.5	305 20 25.6	4 7 37.0	344 4 40.6	5 17 10.7	33 55 37.5	3 16 17.2
30.0	312 24 16.9	4 29 11.5	350 55 18.1	5 13 58.4	40 14 32.0	2 48 0.3
30.5	319 26 6.1	4 46 36.1	357 41 25.8	5 6 25.2	46 29 23.2	2 18 0.8
31.0	326 25 42.6	4 59 38.8	4 23 8.4	4 54 45.7	52 40 37.0	1 46 41.7
31.5	333 22 56.5	-5 8 12.1	11 0 33.3	-4 39 16.8	58 48 38.7	-1 14 25.4

# MOON'S LONGITUDE, &c., 1872. 247

## FOR GREENWICH MEAN NOON AND MIDNIGHT.

Day of Month.	JULY.		AUGUST.		SEPTEMBER.	
	True Longitude.	Latitude	True Longitude.	Latitude.	True Longitude.	Latitude.
1.0	52° 40' 36.9	-1° 46' 41.7	97° 51' 18.1	+2° 17' 29.4	142° 11' 14.7	+4° 48' 19.3
1.5	58 48 38.8	1 14 25.4	103 45 48.6	2 44 49.9	148 12 15.0	4 55 15.5
2.0	64 53 52.8	0 41 34.0	109 40 8.5	3 10 20.6	154 15 13.5	4 58 54.3
2.5	70 56 42.2	-0 8 28.7	115 34 36.5	3 33 46.5	160 20 17.8	4 59 10.0
3.0	76 57 29.4	+0 24 29.3	121 29 29.1	3 54 53.6	166 27 33.8	4 55 59.0
3.5	82 56 33.6	0 56 59.8	127 25 0.5	4 13 28.8	172 37 6.1	4 49 19.5
4.0	88 54 13.6	1 28 43.2	133 21 23.7	4 29 20.1	178 48 58.7	4 39 12.2
4.5	96 50 46.9	1 59 20.6	139 18 50.2	4 42 16.7	185 3 15.6	4 25 40.1
5.0	100 46 29.4	2 28 34.0	145 17 30.8	4 52 9.2	191 20 1.1	4 8 48.6
5.5	106 41 36.5	2 56 6.3	151 17 35.5	4 58 49.7	197 39 20.6	3 48 45.6
6.0	112 36 23.1	3 21 41.3	157 19 15.5	5 2 11.9	204 1 21.1	3 25 41.6
6.5	118 31 3.7	3 45 4.3	163 22 40.8	5 2 10.9	210 26 11.2	2 59 49.5
7.0	124 25 53.0	4 6 1.4	169 28 3.4	4 58 43.9	216 54 1.3	2 31 24.9
7.5	130 21 6.1	4 24 20.1	175 35 36.1	4 51 49.7	223 25 3.8	2 0 45.5
8.0	136 16 58.8	4 39 49.1	181 45 35.2	4 41 28.8	229 59 32.5	1 28 11.9
8.5	142 13 48.2	4 52 18.5	187 58 16.0	4 27 43.8	236 37 42.4	0 54 6.7
9.0	148 11 52.5	5 1 39.5	194 13 57.6	4 10 39.1	243 19 48.7	+0 18 55.2
9.5	154 11 31.4	5 7 44.6	200 33 0.2	3 50 21.3	250 6 6.3	-0 16 55.3
10.0	160 13 6.2	5 10 27.5	206 55 46.0	3 26 58.8	256 56 48.5	0 52 55.0
10.5	166 16 59.7	5 9 43.3	213 22 38.1	3 0 42.8	263 52 6.1	1 28 32.0
11.0	172 23 37.0	5 5 28.3	219 54 0.3	2 31 46.7	270 52 5.7	2 3 12.9
11.5	178 33 24.0	4 57 39.9	226 30 16.0	2 0 26.9	277 56 48.0	2 36 22.6
12.0	184 46 48.5	4 46 17.2	233 11 47.9	1 27 2.9	285 6 7.4	3 7 25.8
12.5	191 4 18.4	4 31 21.0	239 58 56.0	0 51 57.6	292 19 49.6	3 35 47.0
13.0	197 26 22.5	4 12 53.8	246 51 56.8	+0 15 37.3	299 37 31.3	4 0 51.9
13.5	203 53 28.9	3 51 0.5	253 51 1.4	-0 21 27.8	306 58 39.2	4 22 8.9
14.0	210 26 4.6	3 25 48.5	260 56 14.0	0 58 44.1	314 22 30.7	4 39 10.0
14.5	217 4 34.7	2 57 26.6	268 7 30.2	1 35 34.3	321 48 13.6	4 51 32.3
15.0	223 49 20.2	2 26 15.1	275 24 35.1	2 11 18.7	329 14 49.0	4 58 59.6
15.5	230 40 37.9	1 52 26.4	282 47 2.8	2 45 15.6	336 41 12.3	5 1 22.6
16.0	237 38 37.9	1 16 26.0	290 14 15.0	3 16 43.1	344 6 16.2	4 58 40.2
16.5	244 43 22.3	+0 38 42.0	297 45 21.1	3 45 0.4	351 28 53.9	4 50 59.0
17.0	251 54 44.2	-0 0 12.1	305 19 19.9	4 9 30.0	358 48 1.7	4 38 33.3
17.5	259 12 26.1	0 39 38.0	312 55 0.2	4 29 39.0	6 2 42.2	4 21 43.9
18.0	266 35 58.4	1 18 53.0	320 31 4.4	4 45 1.6	13 12 5.9	4 0 56.9
18.5	274 4 39.3	1 57 11.4	328 6 11.5	4 55 20.0	20 15 33.9	3 36 42.3
19.0	281 37 35.7	2 33 46.1	335 39 0.7	5 0 25.2	27 12 38.2	3 9 32.7
19.5	289 13 42.6	3 7 49.9	343 8 15.6	5 0 17.5	34 3 1.8	2 40 1.4
20.0	296 51 47.1	3 38 38.8	350 32 46.9	4 55 5.4	40 46 38.9	2 8 41.6
20.5	304 30 30.4	4 5 33.4	357 51 35.8	4 45 5.2	47 23 33.7	1 36 5.1
21.0	312 8 30.3	4 28 0.8	5 3 56.0	4 30 39.2	53 53 59.3	1 2 41.9
21.5	319 44 25.3	4 45 36.4	12 9 14.2	4 12 14.1	60 18 16.4	-0 28 59.9
22.0	327 16 58.7	4 58 5.0	19 7 10.9	3 50 19.6	66 36 52.0	+0 4 35.6
22.5	334 45 0.8	5 5 20.0	25 57 39.1	3 25 26.7	72 50 17.7	0 37 42.0
23.0	342 7 32.8	5 7 23.8	32 40 43.7	2 58 6.4	78 59 9.0	1 9 58.6
23.5	349 23 48.1	5 4 26.5	39 16 39.4	2 28 49.3	85 4 3.4	1 41 7.1
24.0	356 33 12.8	4 56 44.5	45 45 48.9	1 58 4.0	91 5 40.4	2 10 50.9
24.5	3 35 26.3	4 44 38.9	52 8 41.3	1 26 17.7	97 4 39.9	2 38 54.9
25.0	10 30 20.7	4 28 34.0	58 25 50.6	0 53 55.4	103 1 42.1	3 5 5.3
25.5	17 17 58.8	4 8 56.9	64 37 53.7	-0 21 20.3	108 57 25.9	3 29 9.2
26.0	23 58 33.2	3 46 14.1	70 45 29.8	+0 11 6.2	114 52 20.4	3 50 54.7
26.5	30 32 23.7	3 20 53.3	76 49 18.8	0 43 4.6	120 47 28.7	4 10 10.5
27.0	36 59 57.0	2 53 20.9	82 50 0.3	1 14 16.7	126 42 57.4	4 26 45.7
27.5	43 21 43.2	2 24 3.0	88 48 13.6	1 44 25.4	132 39 26.8	4 40 30.1
28.0	49 38 15.7	1 53 24.0	94 44 36.4	2 13 14.9	138 37 25.1	4 51 14.3
28.5	55 50 9.4	1 21 47.3	100 39 44.4	2 40 30.0	144 37 17.5	4 58 49.3
29.0	61 57 59.7	0 49 35.1	106 34 10.8	3 5 56.2	150 39 25.4	5 3 7.3
29.5	68 2 22.3	-0 17 8.5	112 28 26.2	3 29 19.8	156 44 6.6	5 4 1.5
30.0	74 3 51.5	+0 15 12.6	118 22 58.1	3 50 27.5	162 50 35.3	5 1 26.8
30.5	80 3 0.0	0 47 8.9	124 18 11.0	4 9 6.7	169 2 2.1	4 55 19.8
31.0	86 0 18.4	1 18 22.2	130 14 26.5	4 25 5.6	175 15 33.9	4 45 39.3
31.5	91 56 15.8	+1 48 34.7	136 12 2.6	+4 38 13.1	181 32 14.8	+4 32 26.7

# 248 MOON'S LONGITUDE, &c., 1872.

FOR GREENWICH MEAN NOON AND MIDNIGHT.

Day of Month.	OCTOBER.		NOVEMBER.		DECEMBER.	
	True Longitude.	Latitude.	True Longitude.	Latitude.	True Longitude.	Latitude.
1.0	175° 15' 33.9	+4° 45' 39.3	222° 47' 45.4	+1° 51' 20.2	259° 18' 57.2	-1° 26' 41.7
1.5	181 32 14.8	4 32 26.7	229 34 48.6	1 15 46.9	266 32 12.9	2 4 23.6
2.0	187 52 5.8	4 15 45.8	236 25 16.6	0 38 48.5	273 47 54.6	2 40 15.5
2.5	194 15 5.5	3 55 43.7	243 18 49.9	+0 0 57.8	281 5 15.8	3 13 38.9
3.0	200 41 10.8	3 32 30.7	250 15 7.6	-0 37 10.3	288 23 28.7	3 43 56.0
3.5	207 10 16.7	3 6 20.2	257 13 48.2	1 14 59.5	295 41 46.2	4 10 32.7
4.0	213 42 18.5	2 37 28.9	264 14 30.3	1 51 52.8	302 59 23.7	4 33 4.4
4.5	220 17 12.1	2 6 16.6	271 16 53.0	2 27 13.8	310 15 40.0	4 51 6.7
5.0	226 54 52.9	1 33 6.0	278 20 36.0	3 0 27.1	317 29 58.4	5 4 25.3
5.5	233 35 17.3	0 58 22.6	285 25 20.1	3 30 59.8	324 41 47.3	5 12 51.4
6.0	240 18 23.7	+0 22 34.1	292 30 47.1	3 58 21.4	331 50 40.8	5 16 22.4
6.5	247 4 11.4	-0 13 50.0	299 36 39.6	4 22 5.2	338 56 19.3	5 15 1.5
7.0	253 52 40.7	0 50 18.7	306 42 40.9	4 41 48.4	345 58 28.3	5 8 56.7
7.5	260 43 52.6	1 26 20.0	313 48 35.0	4 57 12.4	352 56 58.2	4 58 20.5
8.0	267 37 48.3	2 1 21.1	320 54 6.0	5 8 3.3	359 51 43.6	4 43 29.4
8.5	274 34 28.4	2 34 49.2	327 58 58.0	5 14 12.0	6 42 43.1	4 24 42.8
9.0	281 33 51.6	3 6 11.8	335 2 54.7	5 15 34.3	13 29 57.9	4 2 22.7
9.5	288 35 55.0	3 34 57.4	342 5 39.4	5 12 11.3	20 13 31.4	3 36 53.4
10.0	295 40 41.8	4 0 36.2	349 6 54.9	5 4 8.4	26 53 28.4	3 9 40.5
10.5	302 47 31.3	4 22 40.6	356 6 23.5	4 51 36.1	33 29 54.8	2 38 10.9
11.0	309 56 38.4	4 40 45.9	3 3 47.2	4 34 49.2	40 2 56.8	2 5 51.9
11.5	317 7 32.2	4 54 31.1	9 58 47.8	4 14 6.8	46 32 41.0	1 32 11.6
12.0	324 19 46.3	5 3 39.8	16 51 7.3	3 49 51.3	52 59 13.6	0 57 37.6
12.5	331 32 49.3	5 8 0.7	23 40 28.6	3 22 28.6	59 22 40.6	-0 22 37.7
13.0	338 46 5.2	5 7 28.3	30 26 35.4	2 52 26.9	65 43 7.8	+0 12 21.5
13.5	345 58 53.3	5 2 3.2	37 9 13.0	2 20 16.0	72 0 40.8	0 46 54.4
14.0	353 10 30.7	4 51 52.3	43 48 9.1	1 46 26.9	78 15 25.4	1 20 36.4
14.5	0 20 13.2	4 37 8.7	50 23 14.0	1 11 30.6	84 27 27.9	1 53 4.7
15.0	7 27 17.3	4 18 11.4	56 54 20.5	0 35 57.8	90 36 55.0	2 23 58.5
15.5	14 31 1.7	3 55 24.0	63 21 25.3	-0 0 18.3	96 43 54.2	2 52 58.7
16.0	21 30 48.8	3 29 14.8	69 44 28.4	+0 35 0.1	102 48 34.6	3 19 48.2
16.5	28 26 6.1	3 0 14.4	76 3 33.7	1 9 31.3	108 51 7.2	3 44 12.3
17.0	35 16 27.7	2 28 55.7	82 18 48.7	1 42 51.6	114 51 44.7	4 5 58.3
17.5	42 1 34.9	1 55 52.2	88 30 24.9	2 14 39.8	120 50 41.8	4 24 55.2
18.0	48 41 16.1	1 21 36.8	94 38 37.3	2 44 36.9	126 48 15.7	4 40 54.1
18.5	55 15 27.4	0 46 44.4	100 43 44.3	3 12 26.5	132 44 46.0	4 53 47.6
19.0	61 44 12.1	-0 11 35.9	106 46 8.2	3 37 54.3	138 40 34.6	5 3 30.2
19.5	68 7 40.1	+0 23 12.2	112 46 13.2	4 0 48.0	144 36 5.8	5 9 57.2
20.0	74 26 7.4	0 57 17.9	118 44 26.7	4 20 57.1	150 31 46.3	5 13 5.5
20.5	80 39 55.1	1 30 18.8	124 41 18.2	4 38 12.7	156 28 5.3	5 12 52.9
21.0	86 49 29.0	2 1 55.2	130 37 19.7	4 52 27.0	162 25 33.7	5 9 18.0
21.5	92 55 18.6	2 31 49.4	136 33 4.6	5 3 33.3	168 24 44.3	5 2 20.6
22.0	98 57 56.1	2 59 46.2	142 29 7.1	5 11 25.8	174 26 11.2	4 52 1.1
22.5	104 57 56.2	3 25 32.1	148 26 2.1	5 15 59.4	180 30 29.6	4 38 21.1
23.0	110 55 55.2	3 48 55.0	154 24 25.1	5 17 9.7	186 38 15.5	4 21 23.4
23.5	116 52 30.2	4 9 44.1	160 24 51.8	5 14 53.2	192 50 4.6	4 1 12.1
24.0	122 48 18.9	4 27 49.7	162 27 56.8	5 9 6.8	199 6 31.4	3 37 53.1
24.5	128 43 58.9	4 43 2.7	172 34 13.8	4 59 48.9	205 28 9.2	3 11 34.9
25.0	134 40 6.9	4 55 15.0	178 44 15.0	4 46 58.7	211 55 28.2	2 42 28.1
25.5	140 37 18.8	5 4 18.7	184 58 29.8	4 30 37.3	218 28 54.5	2 10 47.1
26.0	146 36 8.6	5 10 6.7	191 17 24.8	4 10 47.9	225 8 49.6	1 36 49.7
26.5	152 37 8.7	5 12 32.6	197 41 22.6	3 47 35.9	231 55 28.1	1 0 58.1
27.0	158 40 48.3	5 11 30.7	204 10 41.1	3 21 10.1	238 48 56.7	+0 23 39.2
27.5	164 47 33.6	5 6 56.6	210 45 32.7	2 51 42.9	245 49 12.9	-0 14 35.6
28.0	170 57 47.6	4 58 47.1	217 26 3.2	2 19 30.7	252 56 4.2	0 53 10.4
28.5	177 11 49.6	4 47 1.0	224 12 11.8	1 44 54.3	260 9 6.9	1 31 25.1
29.0	183 29 54.4	4 31 39.3	231 3 51.1	1 8 19.5	267 27 46.2	2 8 37.0
29.5	189 52 12.5	4 12 45.6	238 0 46.7	+0 30 16.3	274 51 16.0	2 44 1.8
30.0	196 18 49.7	3 50 26.4	245 2 36.3	-0 8 40.8	282 18 40.5	3 16 55.2
30.5	202 49 47.2	3 24 52.2	252 8 51.5	0 47 53.7	289 48 55.6	3 46 35.3
31.0	209 25 1.5	2 56 17.0	259 18 57.2	1 26 41.7	297 20 51.3	4 12 24.2
31.5	216 4 24.7	+2 24 58.9	266 32 12.9	-2 4 23.0	304 53 14.4	-4 33 50.1

**ASTRONOMICAL EPHEMERIS**

**FOR THE**

**MERIDIAN OF WASHINGTON.**



# 250 OBLIQUITY OF THE ECLIPTIC, &c.

Mean Noon.	Apparent Obliquity.	Equation of Equinoxes.		Precession of Equinoxes in Longitude.	The Sun's		Mean Longitude of Moon's Ascending Node.
		In Longitude.	In R. A.		Aberration.	Hor. Parallax.	
1872.	23° 27'						
Jan. 1	21.82	-16.49	-1.01	0.00	-20.80	9.00	80° 40.9
11	22.00	16.05	0.98	1.38	20.79	9.00	80 9.1
21	22.22	15.71	0.96	2.75	20.77	8.99	79 37.3
31	22.48	15.52	0.95	4.13	20.74	8.98	79 5.5
Feb 10	22.74	15.49	0.95	5.50	20.71	8.96	78 33.8
20	22.99	15.61	0.95	6.88	-20.67	8.94	78 2.0
Mar. 1	23.21	15.86	0.97	8.26	20.63	8.92	77 30.2
11	23.36	16.21	0.99	9.63	20.57	8.90	76 58.4
21	23.46	16.60	1.02	11.01	20.51	8.87	76 26.7
31	23.49	16.98	1.04	12.38	20.45	8.85	75 54.9
Apr. 10	23.46	17.30	1.06	13.76	-20.39	8.82	75 23.1
20	23.38	17.53	1.07	15.14	20.34	8.80	74 51.3
30	23.28	17.63	1.08	16.51	20.29	8.78	74 19.6
May 10	23.16	17.59	1.08	17.89	20.24	8.76	73 47.8
20	23.06	17.41	1.06	19.26	20.19	8.74	73 16.0
30	22.98	17.12	1.05	20.64	-20.16	8.72	72 44.2
June 9	22.95	16.73	1.02	22.02	20.13	8.71	72 12.5
19	22.98	16.29	1.00	23.39	20.11	8.71	71 40.7
29	23.07	15.85	0.97	24.77	20.11	8.70	71 8.9
July 9	23.22	15.44	0.95	26.14	20.10	8.70	70 37.1
19	23.41	15.11	0.92	27.52	-20.12	8.71	70 5.4
29	23.64	14.89	0.91	28.90	20.14	8.72	69 33.6
Aug. 8	23.88	14.80	0.90	30.27	20.17	8.73	69 1.8
18	24.13	14.84	0.91	31.65	20.20	8.75	68 20.0
28	24.35	15.02	0.92	33.02	20.24	8.77	67 58.3
Sept. 7	24.53	15.29	0.94	34.40	-20.29	8.79	67 26.5
17	24.66	15.64	0.96	35.78	20.35	8.81	66 54.8
27	24.72	16.01	0.98	37.15	20.41	8.84	66 23.0
Oct. 7	24.72	16.35	1.00	38.53	20.47	8.87	65 51.3
17	24.66	16.62	1.02	39.90	20.53	8.88	65 19.5
27	24.56	16.77	1.03	41.28	-20.59	8.91	64 47.7
Nov. 6	24.43	16.77	1.03	42.66	20.64	8.93	64 15.9
16	24.31	16.61	1.02	44.03	20.69	8.95	63 44.2
26	24.20	16.30	1.00	45.41	20.73	8.97	63 12.4
Dec. 6	24.14	15.86	0.97	46.78	20.76	8.98	62 40.6
16	24.13	15.33	0.94	48.16	-20.78	8.99	62 8.8
26	24.19	14.78	0.91	49.54	20.79	9.00	61 37.1
36	24.32	-14.25	-0.87	50.91	-20.79	9.00	61 5.8
Mean Obliquity, 1872.0, 23° 27' 20.77    Motion in 100 days, -0.1272 Precession for 1872.5, . . . 50".2574    Log. 1.70120 Precession in a Solar Day, . . 0".13759    Log. 9.13861 Precession in a Sidereal Day, . 0".13722    Log. 9.13742 Sun's Mean Hor. Parallax, . . 8".848							Daily Motion.  -3.177

## FOR WASHINGTON MEAN MIDNIGHT.

LOGARITHMS FOR REDUCTION OF MEAN PLACES, 1872.0, TO APPARENT PLACES.

Date.	A.	B.	C.	D.	Date.	A.	B.	C.	D.
Jan. 1	$\pi$ 9.5100	$\pi$ 0.0271	$\pi$ 0.5607	1.3022	Mar. 1	$\pi$ 9.1690	$\pi$ 0.4023	$\pi$ 1.2513	0.8011
2	9.5050	0.0337	0.5981	1.3007	2	9.1628	0.4056	1.2537	0.7770
3	9.5000	0.0405	0.6325	1.2989	3	9.1565	0.4088	1.2559	0.7514
4	9.4950	0.0474	0.6640	1.2970	4	9.1501	0.4119	1.2580	0.7241
5	9.4899	0.0544	0.6935	1.2950	5	9.1437	0.4149	1.2600	0.6949
6	$\pi$ 9.4848	$\pi$ 0.0614	$\pi$ 0.7208	1.2928	6	$\pi$ 9.1373	$\pi$ 0.4177	$\pi$ 1.2618	0.6633
7	9.4797	0.0686	0.7463	1.2905	7	9.1308	0.4205	1.2635	0.6292
8	9.4745	0.0759	0.7704	1.2880	8	9.1243	0.4231	1.2650	0.5921
9	9.4693	0.0833	0.7931	1.2854	9	9.1176	0.4256	1.2665	0.5513
10	9.4640	0.0907	0.8144	1.2826	10	9.1110	0.4280	1.2677	0.5062
11	$\pi$ 9.4587	$\pi$ 0.0982	$\pi$ 0.8348	1.2796	11	$\pi$ 9.1042	$\pi$ 0.4302	$\pi$ 1.2689	0.4558
12	9.4534	0.1058	0.8540	1.2765	12	9.0974	0.4324	1.2699	0.3986
13	9.4481	0.1133	0.8723	1.2733	13	9.0905	0.4344	1.2707	0.3326
14	9.4427	0.1210	0.8897	1.2698	14	9.0834	0.4363	1.2714	0.2545
15	9.4373	0.1286	0.9063	1.2662	15	9.0763	0.4381	1.2720	0.1596
16	$\pi$ 9.4319	$\pi$ 0.1362	$\pi$ 0.9221	1.2625	16	$\pi$ 9.0691	$\pi$ 0.4398	$\pi$ 1.2725	0.0374
17	9.4264	0.1439	0.9373	1.2586	17	9.0618	0.4414	1.2728	9.8663
18	9.4209	0.1515	0.9518	1.2545	18	9.0544	0.4429	1.2730	9.5809
19	9.4154	0.1591	0.9657	1.2502	19	9.0469	0.4443	1.2731	$\pi$ 8.4314
20	9.4099	0.1667	0.9791	1.2457	20	9.0392	0.4455	1.2731	$\pi$ 9.5159
21	$\pi$ 9.4043	$\pi$ 0.1742	$\pi$ 0.9919	1.2411	21	$\pi$ 9.0314	$\pi$ 0.4467	$\pi$ 1.2729	$\pi$ 9.8331
22	9.3987	0.1817	1.0042	1.2363	22	9.0234	0.4477	1.2726	0.0145
23	9.3931	0.1891	1.0160	1.2313	23	9.0153	0.4487	1.2721	0.1421
24	9.3875	0.1965	1.0274	1.2260	24	9.0070	0.4495	1.2715	0.2403
25	9.3819	0.2039	1.0384	1.2206	25	8.9985	0.4503	1.2708	0.3201
26	$\pi$ 9.3762	$\pi$ 0.2112	$\pi$ 1.0489	1.2150	26	$\pi$ 8.9898	$\pi$ 0.4509	$\pi$ 1.2700	$\pi$ 0.3874
27	9.3705	0.2184	1.0591	1.2092	27	8.9809	0.4514	1.2690	0.4458
28	9.3648	0.2255	1.0689	1.2031	28	8.9717	0.4519	1.2679	0.4968
29	9.3591	0.2326	1.0783	1.1969	29	8.9624	0.4522	1.2667	0.5423
30	9.3534	0.2396	1.0874	1.1904	30	8.9527	0.4525	1.2654	0.5834
31	$\pi$ 9.3476	$\pi$ 0.2465	$\pi$ 1.0962	1.1836	31	$\pi$ 8.9429	$\pi$ 0.4527	$\pi$ 1.2638	$\pi$ 0.6210
Feb. 1	9.3419	0.2533	1.1047	1.1766	Apr. 1	8.9327	0.4527	1.2622	0.6552
2	9.3361	0.2600	1.1128	1.1694	2	8.9223	0.4527	1.2605	0.6869
3	9.3303	0.2666	1.1208	1.1619	3	8.9114	0.4526	1.2586	0.7162
4	9.3245	0.2731	1.1284	1.1542	4	8.9003	0.4524	1.2565	0.7437
5	$\pi$ 9.3187	$\pi$ 0.2795	$\pi$ 1.1357	1.1462	5	$\pi$ 8.8887	$\pi$ 0.4521	$\pi$ 1.2544	$\pi$ 0.7693
6	9.3129	0.2858	1.1428	1.1378	6	8.8767	0.4517	1.2521	0.7933
7	9.3070	0.2920	1.1496	1.1292	7	8.8643	0.4513	1.2496	0.8160
8	9.3012	0.2981	1.1562	1.1203	8	8.8514	0.4508	1.2470	0.8375
9	9.2953	0.3041	1.1626	1.1110	9	8.8380	0.4502	1.2443	0.8577
10	$\pi$ 9.2895	$\pi$ 0.3100	$\pi$ 1.1687	1.1015	10	$\pi$ 8.8241	$\pi$ 0.4495	$\pi$ 1.2414	$\pi$ 0.8770
11	9.2836	0.3157	1.1746	1.0915	11	8.8095	0.4488	1.2384	0.8952
12	9.2777	0.3213	1.1803	1.0811	12	8.7943	0.4480	1.2352	0.9126
13	9.2718	0.3269	1.1858	1.0706	13	8.7784	0.4471	1.2319	0.9293
14	9.2659	0.3323	1.1911	1.0594	14	8.7618	0.4461	1.2285	0.9451
15	$\pi$ 9.2600	$\pi$ 0.3376	$\pi$ 1.1962	1.0479	15	$\pi$ 8.7443	$\pi$ 0.4451	$\pi$ 1.2249	$\pi$ 0.9603
16	9.2541	0.3428	1.2011	1.0360	16	8.7259	0.4440	1.2211	0.9748
17	9.2481	0.3478	1.2058	1.0235	17	8.7065	0.4429	1.2172	0.9888
18	9.2421	0.3528	1.2103	1.0107	18	8.6860	0.4417	1.2131	1.0022
19	9.2361	0.3576	1.2147	0.9971	19	8.6642	0.4405	1.2088	1.0150
20	$\pi$ 9.2301	$\pi$ 0.3622	$\pi$ 1.2188	0.9831	20	$\pi$ 8.6409	$\pi$ 0.4391	$\pi$ 1.2044	$\pi$ 1.0273
21	9.2241	0.3668	1.2228	0.9685	21	8.6161	0.4378	1.1998	1.0392
22	9.2181	0.3712	1.2266	0.9533	22	8.5894	0.4364	1.1951	1.0507
23	9.2120	0.3755	1.2302	0.9373	23	8.5607	0.4350	1.1901	1.0616
24	9.2060	0.3797	1.2337	0.9206	24	8.5297	0.4335	1.1850	1.0723
25	$\pi$ 9.1999	$\pi$ 0.3838	$\pi$ 1.2370	0.9031	25	$\pi$ 8.4960	$\pi$ 0.4320	$\pi$ 1.1797	$\pi$ 1.0825
26	9.1938	0.3877	1.2402	0.8848	26	8.4589	0.4304	1.1742	1.0923
27	9.1877	0.3915	1.2432	0.8656	27	8.4180	0.4288	1.1685	1.1019
28	9.1815	0.3952	1.2460	0.8452	28	8.3724	0.4272	1.1626	1.1111
29	9.1753	0.3988	1.2488	0.8238	29	8.3298	0.4256	1.1565	1.1199
30	$\pi$ 9.1690	$\pi$ 0.4023	$\pi$ 1.2513	0.8011	30	$\pi$ 8.2615	$\pi$ 0.4239	$\pi$ 1.1502	$\pi$ 1.1285
31	$\pi$ 9.1628	$\pi$ 0.4056	$\pi$ 1.2537	0.7770	31	$\pi$ 8.1920	$\pi$ 0.4222	$\pi$ 1.1437	$\pi$ 1.1367

January 1 to March 22, E = -0".04.

March 23 to June 1, E = -0".05.

## FOR WASHINGTON MEAN MIDNIGHT.

LOGARITHMS FOR REDUCTION OF MEAN PLACES, 1872.0, TO APPARENT PLACES.

Date.	A.	B.	C.	D.	Date.	A.	B.	C.	D.
May 1	$\pi$ 8.1920	$\pi$ 0.4222	$\pi$ 1.1437	$\pi$ 1.1367	July 1	9.2768	$\pi$ 0.4092	0.5360	$\pi$ 1.3032
2	8.1082	0.4205	1.1370	1.1448	2	9.2849	0.4117	0.5731	1.3018
3	8.0030	0.4188	1.1300	1.1525	3	9.2929	0.4143	0.6071	1.3002
4	7.8621	0.4170	1.1228	1.1599	4	9.3007	0.4169	0.6386	1.2986
5	7.6493	0.4153	1.1153	1.1672	5	9.3083	0.4196	0.6679	1.2968
6	$\pi$ 7.2068	$\pi$ 0.4136	$\pi$ 1.1076	$\pi$ 1.1741	6	9.3158	$\pi$ 0.4224	0.6951	$\pi$ 1.2949
7	$\pi$ 7.1004	0.4119	1.0997	1.1809	7	9.3231	0.4253	0.7207	1.2928
8	7.6191	0.4101	1.0914	1.1873	8	9.3302	0.4282	0.7448	1.2907
9	7.8506	0.4084	1.0829	1.1936	9	9.3373	0.4312	0.7674	1.2883
10	8.0017	0.4067	1.0741	1.1998	10	9.3442	0.4342	0.7888	1.2859
11	8.1146	$\pi$ 0.4050	$\pi$ 1.0650	$\pi$ 1.2056	11	9.3509	$\pi$ 0.4373	0.8090	$\pi$ 1.2833
12	8.2049	0.4033	1.0555	1.2113	12	9.3575	0.4405	0.8283	1.2806
13	8.2803	0.4017	1.0457	1.2167	13	9.3639	0.4436	0.8466	1.2778
14	8.3452	0.4000	1.0356	1.2220	14	9.3703	0.4469	0.8642	1.2748
15	8.4019	0.3985	1.0252	1.2271	15	9.3765	0.4502	0.8809	1.2716
16	8.4525	$\pi$ 0.3969	$\pi$ 1.0143	$\pi$ 1.2320	16	9.3826	$\pi$ 0.4535	0.8968	$\pi$ 1.2683
17	8.4983	0.3954	1.0031	1.2367	17	9.3885	0.4568	0.9121	1.2649
18	8.5399	0.3939	0.9914	1.2413	18	9.3944	0.4602	0.9267	1.2614
19	8.5782	0.3925	0.9793	1.2457	19	9.4001	0.4637	0.9408	1.2576
20	8.6136	0.3910	0.9667	1.2499	20	9.4057	0.4671	0.9542	1.2537
21	8.6466	$\pi$ 0.3897	$\pi$ 0.9536	$\pi$ 1.2539	21	9.4112	$\pi$ 0.4706	0.9672	$\pi$ 1.2497
22	8.6774	0.3884	0.9400	1.2578	22	9.4166	0.4740	0.9797	1.2455
23	8.7064	0.3872	0.9258	1.2616	23	9.4219	0.4775	0.9918	1.2412
24	8.7338	0.3860	0.9110	1.2652	24	9.4271	0.4810	1.0033	1.2366
25	8.7597	0.3849	0.8957	1.2686	25	9.4322	0.4845	1.0145	1.2319
26	8.7843	$\pi$ 0.3839	$\pi$ 0.8797	$\pi$ 1.2719	26	9.4372	$\pi$ 0.4880	1.0253	$\pi$ 1.2270
27	8.8077	0.3830	0.8627	1.2750	27	9.4421	0.4916	1.0357	1.2220
28	8.8300	0.3821	0.8452	1.2780	28	9.4469	0.4951	1.0457	1.2168
29	8.8514	0.3813	0.8266	1.2809	29	9.4516	0.4986	1.0554	1.2114
30	8.8719	0.3806	0.8071	1.2836	30	9.4562	0.5021	1.0648	1.2057
31	8.8915	$\pi$ 0.3799	$\pi$ 0.7867	$\pi$ 1.2862	31	9.4607	$\pi$ 0.5056	1.0738	$\pi$ 1.1999
June 1	8.9104	0.3793	0.7651	1.2886	Aug. 1	9.4652	0.5091	1.0826	1.1939
2	8.9285	0.3789	0.7422	1.2909	2	9.4695	0.5126	1.0911	1.1877
3	8.9461	0.3785	0.7179	1.2930	3	9.4738	0.5160	1.0992	1.1812
4	8.9630	0.3782	0.6920	1.2951	4	9.4780	0.5195	1.1071	1.1745
5	8.9794	$\pi$ 0.3780	$\pi$ 0.6644	$\pi$ 1.2970	5	9.4821	$\pi$ 0.5229	1.1148	$\pi$ 1.1676
6	8.9952	0.3780	0.6349	1.2988	6	9.4862	0.5263	1.1221	1.1605
7	9.0106	0.3780	0.6031	1.3004	7	9.4901	0.5297	1.1293	1.1531
8	9.0255	0.3781	0.5685	1.3020	8	9.4940	0.5330	1.1362	1.1455
9	9.0398	0.3783	0.5310	1.3033	9	9.4978	0.5363	1.1429	1.1376
10	9.0539	$\pi$ 0.3787	$\pi$ 0.4897	$\pi$ 1.3046	10	9.5016	$\pi$ 0.5396	1.1495	$\pi$ 1.1294
11	9.0675	0.3791	0.4439	1.3058	11	9.5052	0.5428	1.1557	1.1210
12	9.0807	0.3796	0.3925	1.3068	12	9.5088	0.5460	1.1618	1.1122
13	9.0935	0.3802	0.3342	1.3077	13	9.5124	0.5492	1.1677	1.1032
14	9.1059	0.3810	0.2667	1.3085	14	9.5158	0.5523	1.1733	1.0938
15	9.1181	$\pi$ 0.3818	$\pi$ 0.1867	$\pi$ 1.3091	15	9.5192	$\pi$ 0.5554	1.1788	$\pi$ 1.0841
16	9.1299	0.3828	0.0885	1.3097	16	9.5226	0.5585	1.1841	1.0740
17	9.1415	0.3838	9.9609	1.3101	17	9.5259	0.5615	1.1892	1.0636
18	9.1527	0.3850	9.7796	1.3104	18	9.5291	0.5644	1.1941	1.0528
19	9.1636	0.3863	$\pi$ 9.4609	1.3105	19	9.5323	0.5673	1.1989	1.0415
20	9.1743	$\pi$ 0.3876	$\pi$ 8.3617	$\pi$ 1.3106	20	9.5354	$\pi$ 0.5702	1.2034	$\pi$ 1.0299
21	9.1848	0.3891	9.5237	1.3105	21	9.5385	0.5730	1.2079	1.0177
22	9.1949	0.3907	9.8109	1.3103	22	9.5415	0.5757	1.2121	1.0052
23	9.2049	0.3924	9.9818	1.3100	23	9.5445	0.5784	1.2162	0.9921
24	9.2146	0.3941	0.1038	1.3096	24	9.5474	0.5811	1.2201	0.9784
25	9.2241	$\pi$ 0.3960	0.1989	$\pi$ 1.3090	25	9.5503	$\pi$ 0.5836	1.2239	$\pi$ 0.9642
26	9.2334	0.3980	0.2769	1.3083	26	9.5531	0.5862	1.2275	0.9494
27	9.2424	0.4000	0.3428	1.3076	27	9.5559	0.5886	1.2310	0.9339
28	9.2513	0.4022	0.4000	1.3067	28	9.5586	0.5911	1.2343	0.9177
29	9.2600	0.4045	0.4502	1.3056	29	9.5613	0.5934	1.2375	0.9008
30	9.2685	$\pi$ 0.4068	0.4954	$\pi$ 1.3045	30	9.5640	$\pi$ 0.5957	1.2405	$\pi$ 0.8830
31	9.2768	$\pi$ 0.4092	0.5360	$\pi$ 1.3032	31	9.5666	$\pi$ 0.5979	1.2434	$\pi$ 0.8643

March 23 to June 1, E = -0°.05.

June 2 to December 31, E = -0°.04.

## FOR WASHINGTON MEAN MIDNIGHT.

### LOGARITHMS FOR REDUCTION OF MEAN PLACES, 1872.0, TO APPARENT PLACES.

Date.	A.	B.	C.	D.	Date.	A.	B.	C.	D.
Sept. 1	9.5692	$\pi$ 0.6001	1.2461	$\pi$ 0.8446	Nov. 1	9.7034	$\pi$ 0.6141	1.1566	1.1197
2	9.5717	0.6022	1.2487	0.8239	2	9.7057	0.6129	1.1501	1.1286
3	9.5742	0.6042	1.2512	0.8019	3	9.7081	0.6117	1.1433	1.1372
4	9.5767	0.6062	1.2535	0.7787	4	9.7105	0.6104	1.1363	1.1454
5	9.5792	0.6081	1.2557	0.7541	5	9.7130	0.6091	1.1289	1.1534
6	9.5816	$\pi$ 0.6100	1.2577	$\pi$ 0.7277	6	9.7154	$\pi$ 0.6079	1.1215	1.1612
7	9.5840	0.6118	1.2597	0.6995	7	9.7178	0.6066	1.1137	1.1686
8	9.5863	0.6135	1.2615	0.6693	8	9.7203	0.6053	1.1056	1.1758
9	9.5886	0.6151	1.2631	0.6366	9	9.7228	0.6041	1.0973	1.1828
10	9.5910	0.6167	1.2647	0.6010	10	9.7252	0.6028	1.0886	1.1895
11	9.5932	$\pi$ 0.6182	1.2661	$\pi$ 0.5622	11	9.7278	$\pi$ 0.6015	1.0796	1.1960
12	9.5955	0.6197	1.2674	0.5194	12	9.7303	0.6003	1.0703	1.2022
13	9.5977	0.6211	1.2685	0.4717	13	9.7328	0.5990	1.0606	1.2082
14	9.6000	0.6224	1.2695	0.4180	14	9.7353	0.5978	1.0506	1.2141
15	9.6022	0.6236	1.2704	0.3564	15	9.7378	0.5966	1.0402	1.2197
16	9.6043	$\pi$ 0.6248	1.2712	$\pi$ 0.2844	16	9.7404	$\pi$ 0.5954	1.0294	1.2251
17	9.6065	0.6259	1.2718	0.1978	17	9.7429	0.5942	1.0182	1.2303
18	9.6086	0.6269	1.2723	0.0899	18	9.7455	0.5931	1.0065	1.2353
19	9.6108	0.6279	1.2727	9.9455	19	9.7481	0.5919	0.9944	1.2401
20	9.6129	0.6288	1.2730	9.7267	20	9.7506	0.5909	0.9817	1.2448
21	9.6150	$\pi$ 0.6297	1.2731	$\pi$ 9.2624	21	9.7532	$\pi$ 0.5898	0.9686	1.2492
22	9.6171	0.6304	1.2731	$\pi$ 9.2175	22	9.7558	0.5888	0.9549	1.2536
23	9.6192	0.6311	1.2730	9.7118	23	9.7584	0.5878	0.9406	1.2577
24	9.6213	0.6318	1.2727	9.9370	24	9.7610	0.5869	0.9257	1.2616
25	9.6234	0.6323	1.2724	0.0846	25	9.7636	0.5860	0.9101	1.2654
26	9.6254	$\pi$ 0.6328	1.2718	0.1945	26	9.7662	$\pi$ 0.5851	0.8937	1.2690
27	9.6275	0.6333	1.2712	0.2819	27	9.7688	0.5843	0.8766	1.2724
28	9.6296	0.6337	1.2704	0.3547	28	9.7715	0.5836	0.8587	1.2757
29	9.6316	0.6340	1.2695	0.4170	29	9.7741	0.5829	0.8397	1.2789
30	9.6337	0.6342	1.2685	0.4713	30	9.7767	0.5822	0.8198	1.2818
Oct. 1	9.6358	$\pi$ 0.6344	1.2674	0.5196	Dec. 1	9.7793	$\pi$ 0.5816	0.7988	1.2846
2	9.6378	0.6345	1.2661	0.5628	2	9.7819	0.5811	0.7766	1.2873
3	9.6399	0.6345	1.2646	0.6021	3	9.7845	0.5806	0.7530	1.2898
4	9.6419	0.6345	1.2631	0.6379	4	9.7871	0.5802	0.7279	1.2922
5	9.6440	0.6345	1.2614	0.6711	5	9.7898	0.5799	0.7011	1.2944
6	9.6461	$\pi$ 0.6343	1.2595	0.7016	6	9.7924	$\pi$ 0.5797	0.6725	1.2965
7	9.6482	0.6342	1.2576	0.7301	7	9.7950	0.5795	0.6416	1.2984
8	9.6502	0.6339	1.2555	0.7567	8	9.7976	0.5793	0.6082	1.3002
9	9.6523	0.6336	1.2532	0.7817	9	9.8001	0.5793	0.5718	1.3018
10	9.6544	0.6333	1.2508	0.8053	10	9.8027	0.5793	0.5321	1.3033
11	9.6565	$\pi$ 0.6329	1.2483	0.8274	11	9.8053	$\pi$ 0.5794	0.4880	1.3047
12	9.6586	0.6324	1.2456	0.8484	12	9.8079	0.5795	0.4389	1.3059
13	9.6608	0.6319	1.2428	0.8684	13	9.8104	0.5797	0.3833	1.3070
14	9.6629	0.6313	1.2398	0.8873	14	9.8130	0.5801	0.3195	1.3079
15	9.6650	0.6307	1.2366	0.9053	15	9.8155	0.5804	0.2443	1.3087
16	9.6672	$\pi$ 0.6300	1.2333	0.9225	16	9.8181	$\pi$ 0.5809	0.1532	1.3093
17	9.6694	0.6293	1.2299	0.9389	17	9.8206	0.5815	0.0378	1.3098
18	9.6715	0.6286	1.2263	0.9546	18	9.8231	0.5821	9.8802	1.3102
19	9.6737	0.6278	1.2225	0.9697	19	9.8256	0.5828	9.6284	1.3105
20	9.6759	0.6269	1.2185	0.9842	20	9.8281	0.5836	$\pi$ 9.3638	1.3106
21	9.6781	$\pi$ 0.6260	1.2144	0.9979	21	9.8305	$\pi$ 0.5844	$\pi$ 9.3838	1.3105
22	9.6804	0.6251	1.2101	1.0112	22	9.8330	0.5854	9.7597	1.3104
23	9.6826	0.6241	1.2056	1.0240	23	9.8355	0.5864	9.9581	1.3101
24	9.6849	0.6231	1.2010	1.0363	24	9.8379	0.5875	0.0938	1.3096
25	9.6871	0.6221	1.1961	1.0481	25	9.8403	0.5886	0.1970	1.3090
26	9.6894	$\pi$ 0.6211	1.1911	1.0594	26	9.8427	$\pi$ 0.5898	$\pi$ 0.2801	1.3083
27	9.6917	0.6200	1.1859	1.0704	27	9.8450	0.5912	0.3500	1.3075
28	9.6940	0.6188	1.1804	1.0809	28	9.8474	0.5925	0.4098	1.3064
29	9.6963	0.6177	1.1748	1.0912	29	9.8497	0.5940	0.4622	1.3053
30	9.6986	0.6165	1.1689	1.1011	30	9.8521	0.5955	0.5089	1.3040
31	9.7010	$\pi$ 0.6153	1.1629	1.1105	31	9.8544	$\pi$ 0.5971	$\pi$ 0.5511	1.3026
32	9.7034	$\pi$ 0.6141	1.1566	1.1197	32	9.8567	$\pi$ 0.5987	$\pi$ 0.5893	1.3010

## FOR WASHINGTON MEAN MIDNIGHT.

## QUANTITIES FOR REDUCING MEAN PLACES, 1872.0, TO APPARENT PLACES.

Solar day. Sid. hour.	$\tau$ .	$f$ .	Log $g$ .	G.	Log $h$ .	H.	Log $i$ .	$i$ .	$f$ .	G.	H.
Jan. 1	0.0032	-14.95	0.8180	189° 19'	1.3093	349° 43'	0.1981	-1.58	-0.997	12 37.3	23 18.9
2	.0060	14.79	0.8133	189 34	1.3090	348 47	0.2355	1.72	0.986	12 38.2	23 15.1
3	.0087	14.62	0.8086	189 49	1.3088	347 50	0.2698	1.86	0.975	12 39.3	23 11.3
h 4	.0114	14.45	0.8039	190 5	1.3085	346 54	0.3014	2.00	0.963	12 40.4	23 7.6
(7.0) 5	.0142	14.28	0.7993	190 22	1.3082	345 57	0.3308	2.14	0.952	12 41.5	23 3.8
6	.0169	-14.12	0.7946	190 39	1.3079	345 0	0.3582	-2.28	-0.941	12 42.6	23 0.0
7	.0197	13.95	0.7899	190 57	1.3075	344 3	0.3837	2.42	0.930	12 43.8	22 56.2
8	.0224	13.78	0.7852	191 16	1.3072	343 6	0.4078	2.56	0.919	12 45.1	22 52.4
9	.0251	13.62	0.7804	191 35	1.3068	342 9	0.4305	2.69	0.908	12 46.3	22 48.6
10	.0279	13.46	0.7757	191 55	1.3064	341 12	0.4518	2.83	0.897	12 47.7	22 44.8
11	.0306	-13.29	0.7710	192 16	1.3060	340 15	0.4722	-2.97	-0.886	12 49.1	22 41.0
12	.0333	13.13	0.7663	192 37	1.3055	339 18	0.4914	3.10	0.876	12 50.5	22 37.2
13	.0361	12.97	0.7616	192 59	1.3051	338 20	0.5096	3.23	0.865	12 52.0	22 33.4
14	.0388	12.81	0.7569	193 22	1.3046	337 23	0.5271	3.37	0.854	12 53.5	22 29.5
15	.0416	12.66	0.7522	193 46	1.3041	336 25	0.5437	3.50	0.844	12 55.0	22 25.7
16	.0443	-12.50	0.7475	194 10	1.3036	335 27	0.5595	-3.63	-0.833	12 56.7	22 21.8
17	.0470	12.34	0.7429	194 35	1.3031	334 29	0.5747	3.76	0.823	12 58.3	22 18.0
18	.0498	12.19	0.7382	195 0	1.3026	333 31	0.5892	3.88	0.813	13 0.0	22 14.1
h 19	.0525	12.04	0.7336	195 27	1.3021	332 33	0.6031	4.01	0.802	13 1.8	22 10.2
(8.0) 20	.0552	11.88	0.7290	195 54	1.3015	331 35	0.6165	4.13	0.792	13 3.6	22 6.3
21	.0580	-11.73	0.7245	196 21	1.3010	330 36	0.6293	-4.26	-0.782	13 5.4	22 2.4
22	.0607	11.58	0.7200	196 50	1.3004	329 38	0.6416	4.38	0.772	13 7.3	21 58.5
23	.0635	11.44	0.7155	197 19	1.2998	328 39	0.6534	4.50	0.762	13 9.2	21 54.6
24	.0662	11.29	0.7110	197 48	1.2992	327 40	0.6648	4.62	0.753	13 11.2	21 50.7
25	.0689	11.14	0.7066	198 19	1.2986	326 41	0.6758	4.74	0.743	13 13.2	21 46.7
26	.0717	-11.00	0.7023	198 50	1.2980	325 42	0.6863	-4.86	-0.733	13 15.3	21 42.8
27	.0744	10.86	0.6980	199 21	1.2974	324 43	0.6964	4.97	0.724	13 17.4	21 38.8
28	.0771	10.72	0.6938	199 53	1.2967	323 43	0.7062	5.08	0.714	13 19.6	21 34.9
29	.0799	10.58	0.6896	200 26	1.2961	322 43	0.7157	5.20	0.705	13 21.7	21 30.9
30	.0826	10.44	0.6854	200 59	1.2955	321 44	0.7248	5.31	0.696	13 24.0	21 26.9
31	.0854	-10.30	0.6813	201 33	1.2948	320 44	0.7336	-5.41	-0.687	13 26.2	21 22.9
Feb. 1	.0881	10.17	0.6773	202 8	1.2942	319 44	0.7420	5.52	0.678	13 28.5	21 18.9
2	.0908	10.03	0.6733	202 42	1.2935	318 43	0.7502	5.63	0.669	13 30.8	21 14.9
h 3	.0936	9.90	0.6694	203 18	1.2928	317 43	0.7581	5.73	0.660	13 33.2	21 10.9
(9.0) 4	.0963	9.77	0.6656	203 53	1.2922	316 42	0.7657	5.83	0.651	13 35.6	21 6.8
5	.0991	-9.64	0.6619	204 30	1.2915	315 41	0.7731	-5.93	-0.643	13 38.0	21 2.8
6	.1018	9.51	0.6582	205 6	1.2908	314 40	0.7802	6.03	0.634	13 40.4	20 58.7
7	.1045	9.39	0.6545	205 43	1.2902	313 39	0.7870	6.12	0.626	13 42.9	20 54.6
8	.1073	9.26	0.6510	206 20	1.2895	312 38	0.7936	6.22	0.618	13 45.4	20 50.5
9	.1100	9.14	0.6475	206 58	1.2889	311 36	0.8000	6.31	0.609	13 47.9	20 46.4
10	.1127	-9.02	0.6441	207 36	1.2882	310 35	0.8061	-6.40	-0.601	13 50.4	20 42.3
11	.1155	8.89	0.6408	208 14	1.2875	309 33	0.8120	6.49	0.593	13 52.9	20 38.2
12	.1182	8.78	0.6376	208 52	1.2869	308 31	0.8177	6.57	0.585	13 55.5	20 34.1
13	.1210	8.66	0.6344	209 30	1.2863	307 29	0.8232	6.66	0.577	13 58.0	20 29.9
14	.1237	8.54	0.6313	210 9	1.2856	306 27	0.8285	6.74	0.569	14 0.6	20 25.8
15	.1264	-8.43	0.6282	210 48	1.2850	305 24	0.8336	-6.82	-0.562	14 3.2	20 21.6
16	.1292	8.31	0.6253	211 27	1.2844	304 22	0.8385	6.89	0.554	14 5.8	20 17.4
17	.1319	8.20	0.6224	212 6	1.2838	303 19	0.8432	6.97	0.547	14 8.4	20 13.3
18	.1346	8.09	0.6195	212 45	1.2832	302 16	0.8477	7.04	0.539	14 11.0	20 9.1
h 19	.1374	7.98	0.6168	213 24	1.2826	301 13	0.8520	7.11	0.532	14 13.6	20 4.9
(10.0) 20	.1401	-7.87	0.6140	214 3	1.2820	300 10	0.8562	-7.18	-0.525	14 16.2	20 0.7
21	.1429	7.76	0.6114	214 42	1.2814	299 7	0.8601	7.25	0.517	14 18.8	19 56.4
22	.1456	7.66	0.6088	215 21	1.2809	298 3	0.8639	7.31	0.510	14 21.4	19 52.2
23	.1483	7.55	0.6063	216 0	1.2803	297 0	0.8676	7.37	0.503	14 24.0	19 48.0
24	.1511	7.45	0.6038	216 39	1.2798	295 56	0.8711	7.43	0.496	14 26.6	19 43.7
25	.1538	-7.34	0.6014	217 17	1.2793	294 52	0.8744	-7.49	-0.490	14 29.2	19 39.5
26	.1565	7.24	0.5990	217 56	1.2788	293 48	0.8775	7.54	0.483	14 31.7	19 35.2
27	.1593	7.14	0.5967	218 34	1.2783	292 44	0.8806	7.60	0.476	14 34.3	19 31.0
28	.1620	7.04	0.5944	219 12	1.2779	291 40	0.8834	7.64	0.469	14 36.8	19 26.7
29	.1647	-6.94	0.5922	219 50	1.2774	290 36	0.8861	-7.69	-0.463	14 39.4	19 22.4

## FOR WASHINGTON MEAN MIDNIGHT.

## QUANTITIES FOR REDUCING MEAN PLACES, 1872.0, TO APPARENT PLACES.

Solar day. Sid. hour.	$\tau$	$f$ .	Log $g$ .	G.	Log $h$ .	H.	Log $i$ .	$i$ .	$f$ .	G.	H.
Mar. 1	0.1675	-6.84	0.5000	220° 28'	1.2770	289° 31'	0.8887	-7.74	-0.456	14 41.9	19 18.1
2	.1702	6.75	0.5878	221 6	1.2766	288 27	0.8911	7.78	0.450	14 44.4	19 13.8
3	.1730	6.65	0.5857	221 43	1.2762	287 23	0.8933	7.82	0.443	14 46.9	19 9.5
4	.1757	6.55	0.5836	222 20	1.2759	286 18	0.8954	7.86	0.437	14 49.3	19 5.2
5	.1785	6.46	0.5815	222 57	1.2754	285 13	0.8974	7.90	0.431	14 51.8	19 0.9
<sup>h</sup> (11.0) 6	.1812	-6.36	0.5794	223 34	1.2752	284 9	0.8992	-7.93	-0.424	14 54.3	18 56.6
7	.1839	6.27	0.5774	224 10	1.2749	283 4	0.9009	7.96	0.418	14 56.7	18 52.3
8	.1867	6.18	0.5753	224 47	1.2746	281 59	0.9024	7.99	0.412	14 59.1	18 47.9
9	.1894	6.08	0.5733	225 23	1.2744	280 54	0.9038	8.01	0.406	15 1.5	18 43.6
10	.1921	5.99	0.5712	225 59	1.2741	279 49	0.9051	8.04	0.400	15 3.9	18 39.3
11	.1949	-5.90	0.5692	226 34	1.2739	278 44	0.9062	-8.06	-0.393	15 6.3	18 35.0
12	.1976	5.81	0.5671	227 10	1.2737	277 40	0.9072	8.08	0.387	15 8.6	18 30.6
13	.2004	5.72	0.5651	227 45	1.2736	276 35	0.9081	8.09	0.381	15 11.0	18 26.3
14	.2031	5.63	0.5630	228 20	1.2735	275 30	0.9088	8.11	0.375	15 13.3	18 22.0
15	.2058	5.54	0.5609	228 55	1.2733	274 25	0.9094	8.12	0.369	15 15.7	18 17.6
16	.2086	-5.45	0.5588	229 30	1.2733	273 20	0.9099	-8.13	-0.363	15 18.0	18 13.3
17	.2113	5.36	0.5567	230 5	1.2732	272 15	0.9102	8.13	0.357	15 20.3	18 9.0
18	.2140	5.27	0.5545	230 39	1.2732	271 10	0.9104	8.14	0.351	15 22.6	18 4.7
19	.2168	5.18	0.5524	231 14	1.2731	270 5	0.9105	8.14	0.345	15 24.9	18 0.3
20	.2195	5.09	0.5502	231 48	1.2731	269 0	0.9104	8.14	0.339	15 27.2	17 56.0
<sup>h</sup> (12.0) 21	.2223	-5.00	0.5479	232 22	1.2732	267 55	0.9103	-8.13	-0.333	15 29.5	17 51.7
22	.2250	4.91	0.5457	232 57	1.2732	266 50	0.9099	8.13	0.327	15 31.8	17 47.4
23	.2277	4.82	0.5434	233 31	1.2733	265 46	0.9095	8.12	0.321	15 34.1	17 43.0
24	.2305	4.73	0.5410	234 6	1.2734	264 41	0.9089	8.11	0.315	15 36.4	17 38.7
25	.2332	4.64	0.5386	234 41	1.2735	263 37	0.9082	8.09	0.309	15 38.7	17 34.4
26	.2359	-4.55	0.5362	235 15	1.2737	262 32	0.9074	-8.08	-0.303	15 41.0	17 30.1
27	.2387	4.45	0.5337	235 50	1.2739	261 28	0.9064	8.06	0.297	15 43.3	17 25.8
28	.2414	4.36	0.5312	236 25	1.2741	260 23	0.9053	8.04	0.291	15 45.7	17 21.6
29	.2442	4.27	0.5286	237 1	1.2743	259 19	0.9041	8.02	0.285	15 48.0	17 17.3
30	.2469	4.18	0.5260	237 36	1.2745	258 15	0.9027	7.99	0.279	15 50.4	17 13.0
31	.2496	-4.09	0.5233	238 11	1.2748	257 11	0.9012	-7.96	-0.272	15 52.8	17 8.7
Apr. 1	.2524	3.99	0.5206	238 48	1.2751	256 7	0.8996	7.94	0.266	15 55.2	17 4.5
2	.2551	3.90	0.5178	239 24	1.2754	255 3	0.8979	7.90	0.260	15 57.6	17 0.2
3	.2578	3.80	0.5150	240 1	1.2757	253 59	0.8960	7.87	0.254	16 0.1	16 56.0
4	.2606	3.71	0.5121	240 39	1.2761	252 56	0.8939	7.83	0.247	16 2.6	16 51.7
<sup>h</sup> (13.0) 5	.2633	-3.61	0.5091	241 17	1.2765	251 53	0.8918	-7.79	-0.241	16 5.1	16 47.5
6	.2661	3.51	0.5062	241 55	1.2769	250 49	0.8894	7.75	0.234	16 7.7	16 43.3
7	.2688	3.42	0.5031	242 34	1.2773	249 46	0.8870	7.71	0.228	16 10.3	16 39.1
8	.2715	3.32	0.5000	243 14	1.2777	248 43	0.8844	7.66	0.221	16 12.9	16 34.9
9	.2743	3.22	0.4969	243 54	1.2781	247 41	0.8817	7.61	0.215	16 15.6	16 30.7
10	.2770	-3.12	0.4937	244 35	1.2786	246 38	0.8788	-7.56	-0.208	16 18.4	16 26.5
11	.2798	3.02	0.4905	245 17	1.2791	245 36	0.8758	7.51	0.201	16 21.2	16 22.4
12	.2825	2.92	0.4872	246 0	1.2795	244 33	0.8726	7.46	0.194	16 24.0	16 18.2
13	.2852	2.81	0.4839	246 44	1.2801	243 31	0.8693	7.40	0.188	16 26.9	16 14.1
14	.2880	2.71	0.4806	247 28	1.2806	242 29	0.8658	7.34	0.181	16 29.9	16 10.0
15	.2907	-2.60	0.4772	248 14	1.2811	241 28	0.8622	-7.28	-0.174	16 32.9	16 5.8
16	.2934	2.50	0.4739	249 0	1.2817	240 26	0.8585	7.22	0.167	16 36.0	16 1.7
17	.2962	2.39	0.4705	249 48	1.2822	239 25	0.8545	7.15	0.159	16 39.2	15 57.7
18	.2989	2.28	0.4670	250 37	1.2828	238 24	0.8505	7.09	0.152	16 42.5	15 53.6
19	.3017	2.17	0.4636	251 27	1.2834	237 23	0.8462	7.02	0.145	16 45.8	15 49.5
<sup>h</sup> (14.0) 20	.3044	-2.06	0.4602	252 18	1.2840	236 22	0.8418	-6.95	-0.138	16 49.2	15 45.5
21	.3071	1.95	0.4568	253 11	1.2846	235 22	0.8372	6.87	0.130	16 52.7	15 41.4
22	.3099	1.84	0.4534	254 5	1.2852	234 21	0.8324	6.80	0.123	16 56.3	15 37.4
23	.3126	1.72	0.4500	255 0	1.2858	233 21	0.8275	6.72	0.115	17 0.0	15 33.4
24	.3153	1.61	0.4467	255 57	1.2864	232 21	0.8224	6.64	0.107	17 3.8	15 29.4
25	.3181	-1.49	0.4434	256 55	1.2870	231 21	0.8170	-6.56	-0.099	17 7.7	15 25.4
26	.3208	1.37	0.4402	257 55	1.2876	230 22	0.8116	6.48	0.092	17 11.7	15 21.5
27	.3236	1.25	0.4370	258 56	1.2882	229 23	0.8059	6.40	0.084	17 15.7	15 17.5
28	.3263	1.13	0.4339	259 58	1.2888	228 24	0.8000	6.31	0.076	17 19.9	15 13.6
29	.3290	1.01	0.4309	261 3	1.2895	227 25	0.7939	6.22	0.067	17 24.2	15 9.6
30	.3318	-0.89	0.4280	262 9	1.2901	226 26	0.7876	-6.13	-0.059	17 28.6	15 5.7

## FOR WASHINGTON MEAN MIDNIGHT.

## QUANTITIES FOR REDUCING MEAN PLACES, 1872.0, TO APPARENT PLACES.

Solar day. Sid. hour.	$\tau$	$f$	Log $g$	G.	Log $h$	H.	Log $i$	$i$	$f$	G.	H.
May 1	0.3345	-0.76	0.4252	263 16	1.2908	225 27	n 0.7811	-6.04	-0.051	<sup>b</sup> 17 33.1	<sup>b</sup> 15 1.8
2	.3372	0.64	0.4225	264 25	1.2914	224 29	0.7744	5.95	0.043	17 37.7	14 57.9
3	.3400	0.51	0.4200	265 36	1.2920	223 31	0.7674	5.85	0.034	17 42.4	14 54.1
4	.3427	0.38	0.4177	266 48	1.2927	222 33	0.7601	5.76	0.026	17 47.2	14 50.2
5	.3455	0.25	0.4156	268 2	1.2933	221 35	0.7527	5.66	0.017	17 52.1	14 46.4
<sup>h</sup> (15.0) 6	.3482	-0.12	0.4136	269 17	1.2939	220 38	n 0.7450	-5.56	-0.008	17 57.2	14 42.5
7	.3509	+0.01	0.4119	270 34	1.2946	219 40	0.7371	5.46	+0.001	18 2.3	14 38.7
8	.3537	0.14	0.4104	271 52	1.2952	218 43	0.7288	5.35	0.010	18 7.5	14 34.9
9	.3564	0.28	0.4091	273 11	1.2958	217 46	0.7203	5.25	0.019	18 12.7	14 31.1
10	.3592	0.42	0.4081	274 31	1.2964	216 49	0.7115	5.15	0.028	18 18.1	14 27.3
11	.3619	+0.55	0.4073	275 52	1.2970	215 53	n 0.7024	-5.04	+0.037	18 23.5	14 23.5
12	.3646	0.69	0.4069	277 15	1.2976	214 56	0.6929	4.93	0.046	18 29.0	14 19.8
13	.3674	0.83	0.4067	278 38	1.2982	214 0	0.6831	4.82	0.055	18 34.5	14 16.0
14	.3701	0.97	0.4068	280 1	1.2987	213 4	0.6730	4.71	0.065	18 40.1	14 12.3
15	.3728	1.12	0.4072	281 26	1.2993	212 8	0.6626	4.60	0.074	18 45.7	14 8.5
16	.3756	+1.26	0.4079	282 50	1.2999	211 12	n 0.6517	-4.48	+0.084	18 51.4	14 4.8
17	.3783	1.40	0.4090	284 15	1.3004	210 17	0.6404	4.37	0.094	18 57.0	14 1.1
18	.3811	1.55	0.4104	285 41	1.3010	209 21	0.6288	4.25	0.103	19 2.7	13 57.4
19	.3838	1.70	0.4121	287 6	1.3015	208 26	0.6167	4.14	0.113	19 8.4	13 53.7
<sup>h</sup> 20	.3865	1.85	0.4141	288 31	1.3020	207 31	0.6041	4.02	0.123	19 14.0	13 50.1
(16.0) 21	.3893	+1.99	0.4165	289 55	1.3026	206 36	n 0.5910	-3.90	+0.133	19 19.7	13 46.4
22	.3920	2.14	0.4192	291 19	1.3031	205 41	0.5774	3.78	0.143	19 25.3	13 42.8
23	.3947	2.30	0.4222	292 42	1.3035	204 47	0.5632	3.66	0.153	19 30.8	13 39.1
24	.3975	2.45	0.4256	294 4	1.3040	203 52	0.5484	3.53	0.163	19 36.3	13 35.5
25	.4002	2.60	0.4292	295 25	1.3045	202 58	0.5331	3.41	0.174	19 41.7	13 31.8
26	.4030	+2.76	0.4331	296 45	1.3049	202 4	n 0.5170	-3.29	+0.184	19 47.0	13 28.2
27	.4057	2.91	0.4373	298 4	1.3053	201 9	0.5001	3.16	0.194	19 52.3	13 24.6
28	.4084	3.07	0.4418	299 22	1.3058	200 15	0.4825	3.04	0.205	19 57.4	13 21.0
29	.4112	3.22	0.4466	300 38	1.3061	199 22	0.4640	2.91	0.215	20 2.5	13 17.4
30	.4139	3.38	0.4515	301 52	1.3065	198 28	0.4445	2.78	0.226	20 7.5	13 13.8
31	.4166	+3.54	0.4567	303 4	1.3069	197 34	n 0.4241	-2.66	+0.236	20 12.3	13 10.3
June 1	.4194	3.70	0.4622	304 15	1.3072	196 40	0.4024	2.53	0.247	20 17.0	13 6.7
2	.4221	3.86	0.4678	305 24	1.3076	195 47	0.3796	2.40	0.258	20 21.6	13 3.1
3	.4249	4.02	0.4735	306 32	1.3079	194 54	0.3553	2.27	0.268	20 26.1	12 59.6
<sup>h</sup> 4	.4276	4.18	0.4795	307 38	1.3082	194 0	0.3294	2.13	0.279	20 30.5	12 56.0
(17.0) 5	.4303	+4.35	0.4856	308 41	1.3085	193 7	n 0.3018	-2.00	+0.290	20 34.7	12 52.5
6	.4331	4.51	0.4919	309 43	1.3088	192 14	0.2723	1.87	0.301	20 38.9	12 48.9
7	.4358	4.67	0.4983	310 43	1.3090	191 21	0.2405	1.74	0.312	20 42.8	12 45.4
8	.4386	4.84	0.5048	311 40	1.3092	190 28	0.2059	1.61	0.323	20 46.7	12 41.9
9	.4413	5.00	0.5115	312 37	1.3094	189 35	0.1683	1.47	0.334	20 50.4	12 38.3
10	.4440	+5.17	0.5181	313 30	1.3096	188 42	n 0.1271	-1.34	+0.345	20 54.0	12 34.8
11	.4468	5.33	0.5249	314 22	1.3098	187 49	0.0813	1.21	0.356	20 57.5	12 31.3
12	.4495	5.50	0.5317	315 13	1.3100	186 57	0.0299	1.07	0.367	21 0.8	12 27.8
13	.4522	5.67	0.5385	316 1	1.3101	186 4	9.9716	0.94	0.378	21 4.1	12 24.3
14	.4550	5.83	0.5455	316 47	1.3103	185 11	9.9041	0.80	0.389	21 7.2	12 20.7
15	.4577	+6.00	0.5524	317 32	1.3104	184 19	n 9.8240	-0.67	+0.400	21 10.1	12 17.3
16	.4605	6.17	0.5593	318 15	1.3104	183 26	9.7259	0.53	0.411	21 13.0	12 13.7
17	.4632	6.33	0.5663	318 56	1.3105	182 34	9.5983	0.40	0.422	21 15.7	12 10.2
18	.4659	6.50	0.5732	319 35	1.3105	181 41	9.4170	0.26	0.434	21 18.4	12 6.7
19	.4687	6.67	0.5802	320 13	1.3106	180 49	n 9.0983	-0.13	0.445	21 20.9	12 3.2
<sup>h</sup> (18.0) 20	.4714	+6.84	0.5871	320 49	1.3106	179 56	p 7.9991	+0.01	+0.456	21 23.3	11 59.7
21	.4741	7.01	0.5940	321 24	1.3106	179 4	9.1611	0.14	0.467	21 25.6	11 56.2
22	.4769	7.17	0.6009	321 57	1.3105	178 11	9.4483	0.28	0.478	21 27.8	11 52.7
23	.4796	7.34	0.6077	322 29	1.3105	177 19	9.6192	0.42	0.489	21 29.9	11 49.2
24	.4824	7.51	0.6146	322 59	1.3104	176 26	9.7412	0.55	0.501	21 32.0	11 45.7
25	.4851	+7.68	0.6213	323 28	1.3103	175 34	9.8363	+0.69	+0.512	21 33.9	11 42.2
26	.4878	7.84	0.6281	323 56	1.3102	174 41	9.9143	0.82	0.523	21 35.7	11 38.7
27	.4906	8.01	0.6347	324 22	1.3101	173 49	9.9802	0.96	0.534	21 37.5	11 35.2
28	.4933	8.18	0.6413	324 47	1.3100	172 56	0.0374	1.09	0.545	21 39.1	11 31.7
29	.4960	8.34	0.6479	325 11	1.3098	172 3	0.0676	1.22	0.556	21 40.7	11 28.2
30	.4988	+8.51	0.6544	325 34	1.3096	171 11	0.1328	+1.36	+0.567	21 42.3	11 24.7

## FOR WASHINGTON MEAN MIDNIGHT.

### QUANTITIES FOR REDUCING MEAN PLACES, 1872.0, TO APPARENT PLACES.

Solar day. Sid. hour.	$\tau$ .	$f$ .	Log $g$ .	$G$ .	Log $h$ .	$H$ .	Log $i$ .	$i$ .	$f$ .	$G$ .	$H$ .
July 1 2 3 4 (19.0) 5 6 7 8 9 10 11 12 13 14 15	0.5015	+ 8.67	0.6608	325 56	1.3094	170 18	0.1734	+1.49	+0.578	21 43.7	11 21.2
	.5043	8.84	0.6672	326 16	1.3092	169 25	0.2105	1.62	0.589	21 45.1	11 17.7
	.5070	9.00	0.6735	326 36	1.3090	168 32	0.2445	1.76	0.600	21 46.4	11 14.2
	<sup>h</sup> 4 .5097	9.17	0.6797	326 55	1.3087	167 40	0.2760	1.89	0.611	21 47.6	11 10.6
	(19.0) 5 .5125	9.33	0.6859	327 12	1.3085	166 47	0.3053	2.02	0.622	21 48.8	11 7.1
	6 .5152	+ 9.49	0.6920	327 29	1.3082	165 54	0.3325	+2.15	+0.633	21 50.0	11 3.6
	7 .5180	9.65	0.6981	327 45	1.3079	165 1	0.3580	2.28	0.644	21 51.0	11 0.0
	8 .5207	9.81	0.7040	328 0	1.3076	164 7	0.3821	2.41	0.654	21 52.0	10 56.5
	9 .5234	9.98	0.7099	328 15	1.3072	163 14	0.4048	2.54	0.665	21 53.0	10 52.9
	10 .5262	10.14	0.7158	328 28	1.3069	162 20	0.4262	2.67	0.676	21 53.9	10 49.4
	11 .5289	+10.30	0.7215	328 41	1.3065	161 27	0.4464	+2.79	+0.686	21 54.7	10 45.8
	12 .5316	10.45	0.7271	328 53	1.3061	160 33	0.4657	2.92	0.697	21 55.5	10 42.2
	13 .5344	10.61	0.7327	329 4	1.3057	159 40	0.4840	3.05	0.707	21 56.3	10 38.6
	14 .5371	10.77	0.7383	329 15	1.3053	158 46	0.5016	3.17	0.718	21 57.0	10 35.1
	15 .5399	10.92	0.7437	329 25	1.3049	157 52	0.5182	3.30	0.728	21 57.7	10 31.5
16 17 18 19 20 (20.0) 21 22 23 24 25 26 27 28 29 30 31 Aug. 1 2 3 4 (21.0) 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	.5426	+11.08	0.7491	329 35	1.3044	156 58	0.5342	+3.42	+0.738	21 58.3	10 27.9
	17 .5453	11.23	0.7544	329 44	1.3040	156 4	0.5494	3.54	0.749	21 58.9	10 24.3
	18 .5481	11.39	0.7596	329 52	1.3035	155 10	0.5641	3.66	0.759	21 59.5	10 20.7
	19 .5508	11.54	0.7648	330 0	1.3030	154 16	0.5781	3.79	0.769	22 0.0	10 17.1
	<sup>h</sup> 20 .5535	11.69	0.7698	330 8	1.3025	153 22	0.5916	3.90	0.779	22 0.5	10 13.5
	(20.0) 21 .5563	+11.84	0.7748	330 15	1.3020	152 27	0.6046	+4.02	+0.789	22 1.0	10 9.8
	22 .5590	11.99	0.7797	330 21	1.3015	151 32	0.6171	4.14	0.799	22 1.4	10 6.2
	23 .5618	12.13	0.7846	330 27	1.3009	150 37	0.6291	4.26	0.809	22 1.8	10 2.5
	24 .5645	12.28	0.7894	330 33	1.3004	149 42	0.6407	4.37	0.819	22 2.2	9 58.8
	25 .5672	12.43	0.7941	330 39	1.2999	148 47	0.6519	4.49	0.828	22 2.6	9 55.1
	26 .5700	+12.57	0.7987	330 44	1.2993	147 51	0.6626	+4.60	+0.838	22 2.9	9 51.4
	27 .5727	12.71	0.8033	330 48	1.2988	146 56	0.6730	4.71	0.848	22 3.2	9 47.7
	28 .5754	12.86	0.8078	330 52	1.2982	146 0	0.6831	4.82	0.857	22 3.5	9 44.0
	29 .5782	13.00	0.8122	330 56	1.2976	145 5	0.6928	4.93	0.866	22 3.8	9 40.3
	30 .5809	13.14	0.8166	331 0	1.2970	144 9	0.7021	5.04	0.876	22 4.0	9 36.6
31 Aug. 1 2 3 4 (21.0) 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	.5837	+13.27	0.8209	331 4	1.2964	143 12	0.7112	+5.14	+0.885	22 4.2	9 32.8
	Aug. 1 .5864	13.41	0.8251	331 7	1.2958	142 16	0.7199	5.25	0.894	22 4.5	9 29.1
	2 .5891	13.55	0.8292	331 10	1.2952	141 19	0.7284	5.35	0.903	22 4.7	9 25.3
	3 .5919	13.68	0.8333	331 12	1.2946	140 23	0.7366	5.45	0.912	22 4.8	9 21.5
	<sup>h</sup> 4 .5946	13.81	0.8373	331 15	1.2939	139 26	0.7445	5.55	0.921	22 5.0	9 17.7
	(21.0) 5 .5974	+13.95	0.8413	331 17	1.2933	138 29	0.7521	+5.65	+0.930	22 5.2	9 13.9
	6 .6001	14.08	0.8452	331 20	1.2927	137 32	0.7595	5.75	0.938	22 5.3	9 10.1
	7 .6028	14.21	0.8490	331 22	1.2920	136 34	0.7667	5.84	0.947	22 5.4	9 6.3
	8 .6056	14.33	0.8528	331 23	1.2914	135 37	0.7736	5.94	0.956	22 5.6	9 2.4
	9 .6083	14.46	0.8565	331 25	1.2908	134 39	0.7803	6.03	0.964	22 5.7	8 58.6
	10 .6110	+14.59	0.8601	331 26	1.2902	133 41	0.7868	+6.12	+0.972	22 5.8	8 54.7
	11 .6138	14.71	0.8637	331 28	1.2896	132 43	0.7931	6.21	0.981	22 5.9	8 50.8
	12 .6165	14.83	0.8672	331 29	1.2889	131 44	0.7992	6.30	0.989	22 5.9	8 46.9
	13 .6193	14.95	0.8706	331 30	1.2883	130 46	0.8050	6.38	0.997	22 6.0	8 43.0
	14 .6220	15.07	0.8740	331 31	1.2877	129 47	0.8107	6.47	1.005	22 6.1	8 39.1
15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31	.6247	+15.19	0.8774	331 32	1.2871	128 48	0.8162	+6.55	+1.013	22 6.2	8 35.2
	16 .6275	15.31	0.8806	331 33	1.2865	127 49	0.8215	6.63	1.021	22 6.2	8 31.3
	17 .6302	15.43	0.8839	331 34	1.2859	126 50	0.8266	6.71	1.029	22 6.3	8 27.3
	18 .6329	15.54	0.8870	331 35	1.2853	125 50	0.8315	6.78	1.036	22 6.4	8 23.3
	<sup>h</sup> 19 .6357	15.66	0.8901	331 36	1.2847	124 50	0.8363	6.86	1.044	22 6.4	8 19.4
	(22.0) 20 .6384	+15.77	0.8932	331 37	1.2841	123 50	0.8408	+6.93	+1.051	22 6.5	8 15.4
	21 .6412	15.88	0.8962	331 38	1.2835	122 50	0.8452	7.00	1.059	22 6.6	8 11.4
	22 .6439	15.99	0.8992	331 39	1.2829	121 50	0.8495	7.07	1.066	22 6.6	8 7.4
	23 .6466	16.10	0.9021	331 40	1.2824	120 50	0.8536	7.14	1.074	22 6.7	8 3.3
	24 .6494	16.21	0.9050	331 41	1.2818	119 49	0.8575	7.20	1.081	22 6.7	7 59.3
	25 .6521	+16.32	0.9078	331 42	1.2813	118 48	0.8613	+7.27	+1.088	22 6.8	7 55.2
	26 .6548	16.43	0.9105	331 43	1.2807	117 48	0.8649	7.33	1.095	22 6.9	7 51.2
	27 .6576	16.53	0.9133	331 44	1.2802	116 46	0.8684	7.39	1.102	22 6.9	7 47.1
	28 .6603	16.64	0.9159	331 45	1.2797	115 45	0.8717	7.44	1.109	22 7.0	7 43.0
	29 .6631	16.74	0.9185	331 46	1.2792	114 44	0.8748	7.49	1.116	22 7.1	7 38.9
30 31	.6658	+16.85	0.9211	331 47	1.2788	113 42	0.8779	+7.55	+1.123	22 7.2	7 34.8
	31 .6685	+16.95	0.9236	331 49	1.2783	112 40	0.8807	+7.60	+1.130	22 7.2	7 30.7



## FOR WASHINGTON MEAN MIDNIGHT.

## QUANTITIES FOR REDUCING MEAN PLACES, 1872.0, TO APPARENT PLACES.

Solar day. Sid. hour.	$\tau$ .	$f$ .	Log $g$ .	$G$ .	Log $h$ .	$H$ .	Log $i$ .	$i$ .	$f$ .	$G$ .	$H$ .
Sept. 1	0.6713	+17.05	0.9261	331° 50'	1.2779	111° 39'	0.8835	+7.65	+1.137	<sup>a</sup> 22 <sup>b</sup> 7.3	<sup>b</sup> 7 <sup>m</sup> 26.6
2	.6740	17.15	0.9286	331 51	1.2774	110 36	0.8861	7.69	1.143	22 7.4	7 22.4
3	.6767	17.25	0.9310	331 53	1.2770	109 34	0.8885	7.74	1.150	22 7.5	7 18.3
<sup>h</sup> (23.0) 4	.6795	17.35	0.9333	331 55	1.2766	108 32	0.8909	7.78	1.157	22 7.7	7 14.1
5	.6822	17.45	0.9357	331 57	1.2763	107 29	0.8931	7.82	1.163	22 7.8	7 9.9
6	.6850	+17.54	0.9380	331 58	1.2759	106 26	0.8951	+7.85	+1.170	22 7.9	7 5.8
7	.6877	17.64	0.9402	332 0	1.2756	105 23	0.8971	7.89	1.176	22 8.0	7 1.6
8	.6904	17.74	0.9424	332 2	1.2752	104 21	0.8989	7.92	1.182	22 8.2	6 57.4
9	.6932	17.83	0.9446	332 5	1.2750	103 18	0.9005	7.95	1.189	22 8.3	6 53.2
10	.6959	17.93	0.9468	332 7	1.2747	102 14	0.9021	7.98	1.195	22 8.5	6 49.0
11	.6987	+18.02	0.9489	332 9	1.2744	101 11	0.9035	+8.01	+1.201	22 8.6	6 44.7
12	.7014	18.12	0.9510	332 12	1.2742	100 8	0.9047	8.03	1.208	22 8.8	6 40.5
13	.7041	18.21	0.9530	332 15	1.2740	99 4	0.9059	8.05	1.214	22 9.0	6 36.3
14	.7069	18.30	0.9550	332 18	1.2738	98 1	0.9069	8.07	1.220	22 9.2	6 32.0
15	.7096	18.40	0.9570	332 21	1.2736	96 57	0.9078	8.09	1.226	22 9.4	6 27.8
16	.7123	+18.49	0.9590	332 24	1.2735	95 53	0.9085	+8.10	+1.233	22 9.6	6 23.5
17	.7151	18.58	0.9609	332 28	1.2734	94 49	0.9092	8.11	1.239	22 9.8	6 19.3
18	.7178	18.67	0.9628	332 31	1.2733	93 45	0.9097	8.12	1.245	22 10.1	6 15.0
<sup>h</sup> (0.0) 19	.7206	18.76	0.9647	332 35	1.2732	92 41	0.9101	8.13	1.251	22 10.3	6 10.8
20	.7233	18.86	0.9666	332 39	1.2731	91 38	0.9104	8.14	1.257	22 10.6	6 6.5
21	.7260	+18.95	0.9684	332 43	1.2731	90 34	0.9105	+8.14	+1.263	22 10.9	6 2.2
22	.7288	19.04	0.9703	332 47	1.2731	89 30	0.9105	8.14	1.269	22 11.2	5 58.0
23	.7315	19.13	0.9721	332 52	1.2731	88 26	0.9104	8.14	1.275	22 11.5	5 53.7
24	.7342	19.22	0.9739	332 56	1.2732	87 21	0.9101	8.13	1.282	22 11.8	5 49.4
25	.7370	19.32	0.9756	333 1	1.2733	86 17	0.9097	8.12	1.288	22 12.1	5 45.2
26	.7397	+19.41	0.9774	333 6	1.2734	85 13	0.9092	+8.11	+1.294	22 12.4	5 40.9
27	.7425	19.50	0.9791	333 11	1.2735	84 9	0.9086	8.10	1.300	22 12.8	5 36.6
28	.7452	19.60	0.9808	333 17	1.2736	83 5	0.9078	8.09	1.306	22 13.1	5 32.3
29	.7479	19.69	0.9825	333 22	1.2738	82 0	0.9069	8.07	1.313	22 13.5	5 28.0
30	.7507	19.78	0.9842	333 28	1.2740	80 56	0.9059	8.05	1.319	22 13.9	5 23.8
Oct. 1	.7534	+19.88	0.9859	333 34	1.2742	79 52	0.9047	+8.03	+1.325	22 14.3	5 19.5
2	.7561	19.97	0.9876	333 40	1.2744	78 48	0.9034	8.01	1.331	22 14.7	5 15.2
3	.7589	20.07	0.9893	333 47	1.2747	77 44	0.9020	7.98	1.338	22 15.1	5 10.9
<sup>h</sup> (1.0) 4	.7616	20.16	0.9909	333 53	1.2750	76 40	0.9005	7.95	1.344	22 15.6	5 6.7
5	.7644	20.26	0.9926	334 0	1.2753	75 36	0.8988	7.92	1.351	22 16.0	5 2.4
6	.7671	+20.36	0.9942	334 7	1.2756	74 32	0.8969	+7.89	+1.357	22 16.4	4 58.1
7	.7698	20.45	0.9959	334 14	1.2759	73 28	0.8950	7.85	1.364	22 16.9	4 53.9
8	.7726	20.55	0.9975	334 21	1.2763	72 24	0.8928	7.81	1.370	22 17.4	4 49.6
9	.7753	20.65	0.9992	334 28	1.2767	71 20	0.8906	7.77	1.377	22 17.9	4 45.4
10	.7781	20.75	1.0008	334 35	1.2771	70 17	0.8882	7.73	1.384	22 18.4	4 41.1
11	.7808	+20.85	1.0024	334 43	1.2775	69 13	0.8857	+7.69	+1.390	22 18.9	4 36.9
12	.7835	20.95	1.0041	334 51	1.2779	68 10	0.8830	7.64	1.397	22 19.4	4 32.6
13	.7863	21.06	1.0057	334 59	1.2784	67 6	0.8801	7.59	1.404	22 20.0	4 28.4
14	.7890	21.16	1.0074	335 7	1.2789	66 3	0.8772	7.54	1.411	22 20.5	4 24.2
15	.7917	21.26	1.0091	335 16	1.2794	65 0	0.8740	7.48	1.418	22 21.1	4 20.0
16	.7945	+21.37	1.0107	335 24	1.2799	63 57	0.8707	+7.42	+1.425	22 21.6	4 15.8
17	.7972	21.48	1.0124	335 33	1.2804	62 54	0.8673	7.37	1.432	22 22.2	4 11.6
18	.8000	21.59	1.0141	335 41	1.2809	61 51	0.8636	7.30	1.439	22 22.8	4 7.4
<sup>h</sup> (2.0) 19	.8027	21.70	1.0158	335 50	1.2815	60 48	0.8599	7.24	1.447	22 23.4	4 3.2
20	.8054	21.81	1.0174	335 59	1.2820	59 46	0.8559	7.18	1.454	22 24.0	3 59.1
21	.8082	+21.92	1.0191	336 8	1.2826	58 43	0.8518	+7.11	+1.461	22 24.6	3 54.9
22	.8109	22.03	1.0209	336 18	1.2832	57 41	0.8475	7.04	1.469	22 25.2	3 50.7
23	.8136	22.14	1.0226	336 27	1.2838	56 39	0.8430	6.97	1.476	22 25.8	3 46.6
24	.8164	22.26	1.0243	336 36	1.2844	55 37	0.8383	6.89	1.484	22 26.4	3 42.5
25	.8191	22.38	1.0261	336 46	1.2850	54 35	0.8335	6.82	1.492	22 27.1	3 38.3
26	.8219	+22.49	1.0278	336 55	1.2856	53 33	0.8285	+6.74	+1.500	22 27.7	3 34.2
27	.8246	22.61	1.0296	337 5	1.2862	52 32	0.8232	6.66	1.508	22 28.3	3 30.1
28	.8273	22.73	1.0314	337 15	1.2869	51 30	0.8178	6.57	1.516	22 29.0	3 26.0
29	.8301	22.86	1.0332	337 24	1.2875	50 29	0.8122	6.49	1.524	22 29.6	3 21.9
30	.8328	22.98	1.0350	337 34	1.2881	49 28	0.8063	6.40	1.532	22 30.3	3 17.8
31	0.8355	+23.11	1.0369	337 44	1.2888	48 27	0.8003	+6.31	+1.540	22 30.9	3 13.8

## FOR WASHINGTON MEAN MIDNIGHT.

### QUANTITIES FOR REDUCING MEAN PLACES, 1872.0, TO APPARENT PLACES.

Solar day. Sid. hour.	$\tau$ .	$f$ .	Log $g$ .	$G$ .	Log $h$ .	$H$ .	Log $i$ .	$i$ .	$f$ .	$G$ .	$H$ .
Nov. 1	0.5383	+23.23	1.0387	337° 54	1.2894	47° 26	0.7940	+6.22	+1.549	22 31.6	3 9.7
2	.8410	23.26	1.0406	338 4	1.2901	46 25	0.7875	6.13	1.557	22 32.3	3 5.7
h 3	.8438	23.49	1.0425	338 14	1.2908	45 24	0.7807	6.04	1.566	22 32.9	3 1.6
(3.0) 4	.8465	23.62	1.0444	338 24	1.2914	44 24	0.7737	5.94	1.575	22 33.6	2 57.6
5	.8492	23.75	1.0463	338 34	1.2921	43 23	0.7663	5.84	1.583	22 34.3	2 53.6
6	.8520	+23.88	1.0482	338 44	1.2928	42 23	0.7589	+5.74	+1.592	22 34.9	2 49.6
7	.8547	24.02	1.0502	338 54	1.2934	41 23	0.7511	5.64	1.601	22 35.6	2 45.6
8	.8575	24.16	1.0522	339 4	1.2941	40 24	0.7430	5.53	1.610	22 36.2	2 41.6
9	.8602	24.29	1.0542	339 13	1.2947	39 24	0.7347	5.43	1.620	22 36.9	2 37.6
10	.8629	24.43	1.0562	339 23	1.2954	38 24	0.7260	5.32	1.629	22 37.5	2 33.6
11	.8657	+24.58	1.0582	339 33	1.2960	37 25	0.7170	+5.21	+1.638	22 38.2	2 29.7
12	.8684	24.72	1.0603	339 43	1.2966	36 26	0.7077	5.10	1.648	22 38.8	2 25.7
13	.8711	24.86	1.0624	339 52	1.2973	35 27	0.6980	4.99	1.658	22 39.5	2 21.8
14	.8739	25.01	1.0644	340 2	1.2979	34 28	0.6880	4.88	1.667	22 40.1	2 17.9
15	.8766	25.15	1.0665	340 11	1.2985	33 29	0.6775	4.76	1.677	22 40.8	2 13.9
16	.8794	+25.30	1.0687	340 21	1.2991	32 30	0.6668	+4.64	+1.687	22 41.4	2 10.0
17	.8821	25.45	1.0708	340 30	1.2997	31 32	0.6555	4.52	1.697	22 42.0	2 6.1
h 18	.8848	25.60	1.0729	340 39	1.3002	30 34	0.6438	4.40	1.707	22 42.6	2 2.2
(4.0) 19	.8876	25.75	1.0751	340 49	1.3008	29 35	0.6317	4.28	1.717	22 43.2	1 58.4
20	.8903	25.91	1.0773	340 57	1.3014	28 37	0.6191	4.16	1.727	22 43.8	1 54.5
21	.8930	+26.06	1.0795	341 6	1.3019	27 39	0.6060	+4.04	+1.738	22 44.4	1 50.6
22	.8958	26.22	1.0817	341 15	1.3025	26 41	0.5922	3.91	1.748	22 45.0	1 46.8
23	.8985	26.38	1.0839	341 24	1.3030	25 44	0.5780	3.78	1.758	22 45.6	1 42.9
24	.9013	26.54	1.0862	341 32	1.3035	24 46	0.5630	3.66	1.769	22 46.1	1 39.1
25	.9040	26.70	1.0884	341 40	1.3040	23 48	0.5475	3.53	1.780	22 46.7	1 35.2
26	.9067	+26.86	1.0907	341 49	1.3045	22 51	0.5311	+3.40	+1.791	22 47.2	1 21.4
27	.9095	27.02	1.0930	341 57	1.3050	21 54	0.5140	3.27	1.801	22 47.8	1 27.6
28	.9122	27.18	1.0953	342 4	1.3054	20 56	0.4960	3.13	1.812	22 48.3	1 23.8
29	.9149	27.35	1.0976	342 12	1.3058	19 59	0.4771	3.00	1.823	22 48.8	1 20.0
30	.9177	27.51	1.0999	342 20	1.3063	19 2	0.4572	2.87	1.834	22 49.3	1 16.2
Dec. 1	.9204	+27.68	1.1022	342 27	1.3067	18 5	0.4362	+2.73	+1.845	22 49.8	1 12.4
2	.9232	27.85	1.1046	342 34	1.3070	17 9	0.4139	2.59	1.857	22 50.3	1 8.6
3	.9259	28.02	1.1069	342 41	1.3074	16 12	0.3904	2.46	1.868	22 50.7	1 4.8
h 4	.9286	28.18	1.1092	342 48	1.3078	15 15	0.3653	2.32	1.879	22 51.2	1 1.0
(5.0) 5	.9314	28.35	1.1116	342 54	1.3081	14 19	0.3385	2.18	1.890	22 51.6	0 57.2
6	.9341	+28.53	1.1139	343 0	1.3084	13 22	0.3098	+2.04	+1.902	22 52.0	0 53.5
7	.9369	28.70	1.1163	343 7	1.3087	12 26	0.2789	1.90	1.913	22 52.4	0 49.7
8	.9396	28.87	1.1187	343 13	1.3090	11 29	0.2456	1.76	1.925	22 52.8	0 46.0
9	.9423	29.04	1.1210	343 18	1.3092	10 33	0.2092	1.62	1.936	22 53.2	0 42.2
10	.9451	29.22	1.1234	343 24	1.3095	9 37	0.1695	1.48	1.948	22 53.6	0 38.4
11	.9478	+29.39	1.1258	343 29	1.3097	8 40	0.1254	+1.33	+1.960	22 54.0	0 34.7
12	.9505	29.57	1.1282	343 35	1.3099	7 44	0.0762	1.19	1.971	22 54.3	0 30.9
13	.9533	29.74	1.1306	343 40	1.3100	6 48	0.0207	1.05	1.983	22 54.6	0 27.2
14	.9560	29.92	1.1329	343 44	1.3102	5 52	9.9569	0.91	1.994	22 55.0	0 23.5
15	.9588	30.09	1.1353	343 49	1.3103	4 56	9.8817	0.76	2.006	22 55.3	0 19.7
16	.9615	+30.27	1.1377	343 53	1.3104	4 0	9.7906	+0.62	+2.018	22 55.6	0 16.0
17	.9642	30.45	1.1400	343 57	1.3105	3 3	9.6752	0.47	2.030	22 55.8	0 12.2
18	.9670	30.62	1.1424	344 1	1.3105	2 7	9.5176	0.33	2.042	22 56.1	0 8.5
h 19	.9697	30.80	1.1448	344 5	1.3106	1 11	9.2758	0.19	2.053	22 56.3	0 4.8
(6.0) 20	.9724	30.98	1.1471	344 9	1.3106	0 15	8.6012	+0.04	2.065	22 56.6	0 1.0
21	.9752	+31.15	1.1495	344 12	1.3106	359 19	n 9.0212	-0.10	+2.077	22 56.8	23 57.3
22	.9779	31.33	1.1518	344 15	1.3105	358 23	9.3970	0.25	2.089	22 57.0	23 53.6
23	.9807	31.51	1.1542	344 18	1.3105	357 27	9.5955	0.39	2.101	22 57.2	23 49.8
24	.9834	31.69	1.1565	344 21	1.3104	356 31	9.7311	0.54	2.112	22 57.4	23 46.1
25	.9861	31.86	1.1588	344 24	1.3103	355 35	9.8344	0.68	2.124	22 57.6	23 42.3
26	.9889	+32.04	1.1611	344 26	1.3102	354 39	n 9.9175	-0.83	+2.136	22 57.7	23 38.6
27	.9916	32.22	1.1634	344 28	1.3101	353 43	9.9874	0.97	2.148	22 57.9	23 34.8
28	.9943	32.39	1.1657	344 30	1.3099	352 46	0.0471	1.11	2.159	22 58.0	23 31.1
29	.9971	32.57	1.1680	344 32	1.3098	351 50	0.0996	1.26	2.171	22 58.1	23 27.3
30	.9998	32.74	1.1703	344 34	1.3096	350 54	0.1463	1.40	2.183	22 58.2	23 23.6
31	1.0026	+32.92	1.1725	344 35	1.3093	349 57	n 0.1885	-1.54	+2.194	22 58.3	23 19.8
32	1.0053	+33.09	1.1747	344 36	1.3091	349 1	n 0.2267	-1.69	+2.206	22 58.4	23 16.0

# BESSEL'S FORMULÆ OF REDUCTION FOR THE FIXED STARS,

WITH DR. PETERS'S COEFFICIENTS, AND BESSEL'S NOTATION.

$$A = \tau - 0.34243 \sin \Omega + 0.00410 \sin 2 \Omega - 0.02519 \sin 2 \odot + 0.00294 \sin (\odot + 82^\circ 18').$$

$$B = -9''.2237 \cos \Omega + 0''.0896 \cos 2 \Omega - 0''.5507 \cos 2 \odot - 0''.0093 \cos (\odot + 280^\circ 44').$$

$$C = -20''.4451 \cos \omega \cos \odot.$$

$$D = -20''.4451 \sin \odot.$$

$$E = -0''.0468 \sin \Omega + 0''.0014 \sin 2 \Omega - 0''.0034 \sin 2 \odot$$

$$a = 3''.07219 + 1''.33697 \sin a \tan \delta.$$

$$b = \frac{1}{\Gamma} \cos a \tan \delta.$$

$$c = \frac{1}{\Gamma} \cos a \sec \delta.$$

$$d = \frac{1}{\Gamma} \sin a \sec \delta.$$

$$a' = 20''.0545 \cos a.$$

$$b' = -\sin a.$$

$$c' = \tan \omega \cos \delta - \sin a \sin \delta.$$

$$d' = \cos a \sin \delta.$$

$\mu$  = the annual proper motion in right ascension.

$\mu'$  = the annual proper motion in declination.

$\tau$  = the time reckoned from Jan. 1<sup>d</sup> - 680, (when the sun's mean longitude is  $280^\circ$ ), and expressed in fractional parts of a tropical year.

$\odot$  = the sun's true longitude.

$\Omega$  = the longitude of the moon's ascending node.

$\omega$  = the obliquity of the ecliptic.

$a$  = the star's mean right ascension for the beginning of the year

$\delta$  = the star's mean declination for the beginning of the year.

$a'$  = the star's apparent right ascension at the time  $\tau$ .

$\delta'$  = the star's apparent declination at the time  $\tau$ .

$$a' - a = A a + B b + C c + D d + E + \tau \mu. \quad (\text{In time.})$$

$$\delta' - \delta = A a' + B b' + C c' + D d' + \tau \mu'.$$

The following formulæ may also be used by putting

$$f = 46''.0828 A + E = 3''.07219 A + \frac{1}{\Gamma} E. \quad i = C \tan \omega.$$

$$g \cos G = 20''.0545 A.$$

$$h \sin H = C.$$

$$g \sin G = B$$

$$h \cos H = D.$$

$$a' - a = f + \tau \mu + \frac{1}{\Gamma} g \sin (G + a) \tan \delta + \frac{1}{\Gamma} h \sin (H + a) \sec \delta. \quad (\text{In time.})$$

$$\delta' - \delta = \tau \mu' + g \cos (G + a) + h \cos (H + a) \sin \delta + i \cos \delta.$$

Tables V. and VI. of the Appendix contain the following terms, which may be added to A and B, when great accuracy is required:

$$\begin{aligned} \Delta A = & -0.00405 \sin 2 \varrho + 0.00135 \sin (\varrho - \Gamma') + 0.00025 \sin (2 \odot - \Omega) \\ & + 0.00010 \sin 2 (\odot - \Gamma') - 0.00005 \sin 2 (\odot - \Omega) + 0.00009 \sin (2 \Gamma' - \Omega) \\ & + 0.00005 \cos \Gamma' + 0.00004 \sin 2 \Gamma' - 0.00011 \sin (3 \odot - \Gamma'). \end{aligned}$$

$$\begin{aligned} \Delta B = & -0''.0886 \cos 2 \varrho + 0''.0067 \cos (2 \odot - \Omega) + 0''.0024 \cos (2 \Gamma' - \Omega) \\ & - 0''.0023 \sin \Gamma' + 0''.0008 \cos 2 \Gamma' - 0''.0027 \cos (3 \odot - \Gamma'). \end{aligned}$$

In which—

$\varrho$  = the moon's mean longitude.

$\Gamma$  = the longitude of the sun's perigee.

$\Gamma'$  = the longitude of the moon's perigee.

Other terms, which become sensible for stars very near the pole, will be found on page 505.

MEAN PLACES FOR 1872.0. (Jan. 1—<sup>d</sup>680, Washington.)

Star's Name.	Magnitude.	Right Ascension.	An. Variation.	Declination.	An. Variation.
<i>α</i> Andromedæ . . . .	2	<sup>h</sup> 0 <sup>m</sup> 1 46.469	+ 3.088	+28° 23' 1.97	+19.90
<i>γ</i> Pegasi ( <i>Algenib</i> ) . .	3.2	0 6 38.783	3.083	+14 28 19.42	20.05
* <i>β</i> Hydri . . . . .	3	0 18 59.128	3.256	−77 58 33.93	20.25
<i>α</i> Cassiopeæ . . . .	var.	0 33 15.409	3.365	+55 50 5.65	19.80
<i>β</i> Ceti . . . . .	2	0 37 9.767	3.013	−18 41 22.05	19.83
*21 Cassiopeæ . . . .	6	0 37 14.031	+ 3.829	+74 17 14.57	+19.73
<i>ε</i> Piscium . . . . .	4	0 56 18.096	3.110	+ 7 12 2.04	19.48
* <i>α</i> Ursæ Min. ( <i>Polaris</i> )	2	1 11 58.231	20.424	+88 37 36.63	19.08
<i>θ</i> <sup>1</sup> Ceti . . . . .	3	1 17 37.539	2.998	− 8 50 39.13	18.72
*38 Cassiopeæ . . . .	6	1 21 44.348	4.353	+69 36 16.76	18.71
<i>η</i> Piscium . . . . .	4.3	1 24 38.125	+ 3.200	+14 41 7.65	+18.72
<i>α</i> Eridani ( <i>Achernar</i> ) .	1	1 32 56.494	2.235	−57 53 14.66	18.42
<i>ο</i> Piscium . . . . .	4	1 38 38.234	3.162	+ 8 30 45.60	18.26
<i>β</i> Arietis . . . . .	3.2	1 47 34.335	3.301	+20 10 53.65	17.79
*50 Cassiopeæ . . . .	4	1 52 32.927	4.978	+71 47 59.74	17.68
<i>α</i> Arietis . . . . .	2	1 59 57.687	+ 3.368	+22 51 22.29	+17.24
<i>ξ</i> <sup>1</sup> Ceti . . . . .	4.5	2 6 13.002	3.169	+ 8 14 42.52	17.08
* <i>ι</i> Cassiopeæ . . . .	4	2 18 32.831	4.839	+66 49 28.77	16.48
<i>γ</i> Ceti . . . . .	3.4	2 36 40.189	3.102	+ 2 41 42.54	15.40
<i>α</i> Ceti . . . . .	2.3	2 55 35.395	3.129	+ 3 35 9.86	14.36
*48 Cephei (H.) . . .	6	3 4 9.912	+ 7.345	+77 15 36.68	+13.86
<i>ζ</i> Arietis . . . . .	4.5	3 7 32.832	3.437	+20 34 7.24	13.65
<i>α</i> Persei . . . . .	2	3 15 11.622	4.248	+49 24 11.46	13.17
<i>δ</i> Persei . . . . .	3	3 33 49.051	4.239	+47 22 32.35	11.89
<i>η</i> Tauri . . . . .	3	3 39 52.701	3.554	+23 42 26.56	11.46
<i>ζ</i> Persei . . . . .	3	3 46 5.384	+ 3.756	+31 30 4.76	+11.04
<i>γ</i> <sup>1</sup> Eridani . . . . .	3	3 52 3.474	2.797	−13 52 26.25	10.53
<i>γ</i> Tauri . . . . .	4	4 12 30.647	3.407	+15 18 59.95	9.06
<i>ε</i> Tauri . . . . .	4.3	4 21 8.646	3.495	+18 53 40.58	8.38
<i>α</i> Tauri ( <i>Aldebaran</i> ) .	1	4 28 34.663	3.436	+16 15 0.10	7.62
* 9 Camelopardalis . .	4	4 41 20.270	+ 5.913	+66 7 17.06	+ 6.76
<i>ι</i> Aurigæ . . . . .	3	4 48 39.612	3.897	+32 57 39.73	6.13
11 Orionis . . . . .	5	4 57 15.423	3.425	+15 13 25.56	5.41
<i>α</i> Aurigæ ( <i>Capella</i> ) . .	1	5 7 14.175	4.422	+45 51 53.33	4.15
<i>β</i> Orionis ( <i>Rigel</i> ) . .	1	5 8 23.217	2.881	− 8 21 4.94	4.48
<i>β</i> Tauri . . . . .	2	5 18 12.088	+ 3.788	+28 29 48.39	+ 3.46
* Groombridge 966 . .	6.7	5 22 37.655	7.988	+74 57 11.88	3.25
<i>δ</i> Orionis . . . . .	2	5 25 28.102	3.064	− 0 23 45.63	3.00
<i>α</i> Leporis . . . . .	3	5 27 5.175	2.646	−17 54 55.83	2.90
<i>ε</i> Orionis . . . . .	2	5 29 43.138	3.042	− 1 17 8.40	2.65
<i>α</i> Columbæ . . . . .	2	5 35 0.924	+ 2.173	−34 8 36.66	+ 2.16
<i>α</i> Orionis . . . . .	var.	5 48 14.562	3.247	+ 7 22 51.83	+ 1.05
*22 Camelopardalis (H.)	5.4	6 4 44.077	6.619	+69 21 37.20	− 0.52
<i>μ</i> Geminorum . . . .	3	6 15 13.028	3.633	+22 34 37.13	1.44
<i>α</i> Argus ( <i>Canopus</i> ) . .	1	6 21 6.741	1.330	−52 37 35.73	1.84
<i>γ</i> Geminorum . . . .	2.3	6 30 19.054	+ 3.469	+16 30 23.11	− 2.67
<i>α</i> Canis Maj. ( <i>Sirius</i> ) .	1	6 39 30.419	2.645	−16 32 31.67	4.65
*51 Cephei (H.) . . .	5	6 39 43.629	30.297	+87 14 15.13	3.41
<i>ε</i> Canis Majoris . . .	2.1	6 53 35.802	+ 2.358	−28 47 57.70	− 4.64

\* Circumpolar Stars

MEAN PLACES FOR 1872.0. (Jan. 1—<sup>d</sup>680, Washington.)

Star's Name.	Magnitude.	Right Ascension.	An. Variation.	Declination.	An. Variation.
		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>
δ Canis Majoris . . .	2	7 3 11.273	+ 2.440	−26 11' 27.95	− 5.42
δ Geminorum . . .	3.4	7 12 28.663	3.591	+22 12 57.26	6.23
* Piazzii vii. 67 . . .	6	7 17 32.486	6.313	+68 43 21.95	6.73
α Geminor. ( <i>Castor</i> ) . .	2.1	7 26 25.529	3.839	+32 10 0.28	7.46
α Can. Min. ( <i>Procyon</i> ) .	1	7 32 36.120	3.146	+ 5 33 3.72	8.93
β Geminor. ( <i>Pollux</i> ) . .	1.2	7 37 28.868	+ 3.682	+28 19 59.98	− 8.32
φ Geminorum . . .	5	7 45 39.724	3.684	+27 5 41.90	8.94
* 3 Ursæ Majoris (H.) . .	6	8 0 2.769	6.070	+68 50 49.79	10.04
15 Argus (ι) . . .	3	8 2 5.657	2.556	−23 56 11.47	10.11
ε Hydræ . . .	3.4	8 39 59.831	3.184	+ 6 53 13.51	12.91
ι Ursæ Majoris . . .	3	8 50 26.008	+ 4.141	+48 32 31.88	−13.84
* σ <sup>2</sup> Ursæ Majoris . . .	5	8 59 5.923	5.378	+67 39 4.06	14.22
κ Cancri . . .	5	9 0 48.745	3.255	+11 10 55.44	14.21
ι Argus . . .	2	9 13 39.750	1.602	−58 44 16.89	14.93
* 1 Draconis (H.) . . .	4.5	9 18 38.586	9.137	+81 53 19.77	15.28
α Hydræ . . .	2	9 21 17.854	+ 2.950	− 8 6 17.29	−15.39
* δ Ursæ Majoris . . .	5.4	9 23 7.252	5.430	+70 23 26.04	15.49
θ Ursæ Majoris . . .	3	9 24 16.940	4.051	+52 15 32.77	16.15
ε Leonis . . .	3	9 38 34.962	3.420	+24 21 45.26	16.36
μ Leonis . . .	4	9 45 28.774	3.425	+26 36 31.39	16.74
α Leonis ( <i>Regulus</i> ) . .	1.2	10 1 33.241	+ 3.203	+12 35 31.65	−17.41
* 32 Ursæ Majoris . . .	6	10 8 42.699	4.441	+65 44 43.32	17.77
γ <sup>1</sup> Leonis . . .	2	10 12 54.759	3.317	+20 29 18.17	18.02
* 9 Draconis (H.) . . .	5.4	10 24 9.112	5.310	+76 22 15.09	18.36
ρ Leonis . . .	4	10 26 4.258	3.166	+ 9 57 52.60	18.39
η Argus . . .	2	10 40 5.981	+ 2.310	−59 0 40.25	−18.76
ι Leonis . . .	5	10 42 31.653	3.159	+11 13 19.75	18.92
α Ursæ Majoris . . .	2	10 55 48.553	3.761	+62 26 28.70	19.36
δ Leonis . . .	2.3	11 7 17.957	3.202	+21 13 29.45	19.65
δ Crateris . . .	3.4	11 12 56.572	2.996	−14 5 9.40	19.44
τ Leonis . . .	5	11 21 21.290	+ 3.088	+ 3 33 39.86	−19.78
* λ Draconis . . .	3.4	11 23 46.644	3.641	+70 2 12.63	19.86
υ Leonis . . .	5.4	11 30 23.751	3.072	− 0 7 1.36	19.83
β Leonis . . .	2	11 42 31.776	3.066	+15 17 16.13	20.09
γ Ursæ Majoris . . .	2.3	11 47 5.285	3.189	+54 24 23.05	20.02
ο Virginis . . .	4	11 58 41.337	+ 3.060	+ 9 26 39.14	−20.00
* 4 Draconis (H.) . . .	5.4	12 6 10.656	2.908	+78 19 37.83	20.06
* β Chamæleontis . . .	5	12 10 52.613	3.342	−78 36 6.05	20.04
η Virginis . . .	3.4	12 13 21.479	3.068	+ 0 2 41.72	20.03
α <sup>1</sup> Crucis . . .	1	12 19 29.228	3.266	−62 23 18.04	19.93
β Corvi . . .	2.3	12 27 40.017	+ 3.138	−22 41 17.25	−19.95
* κ Draconis . . .	3.4	12 28 0.490	2.601	+70 29 37.23	19.93
* 32 Camelop. (H.) ( <i>fol.</i> )	5.4	12 48 12.719	0.355	+84 6 29.91	19.63
12 Canum Venaticorum	3	12 50 2.235	2.817	+39 0 36.90	19.51
θ Virginis . . .	4.5	13 3 19.481	3.101	− 4 51 17.30	19.31
α Virginis ( <i>Spica</i> ) . .	1	13 18 27.142	+ 3.153	−10 29 31.88	−18.91
ζ Virginis . . .	3.4	13 28 10.337	3.053	+ 0 3 34.80	18.52
η Ursæ Majoris . . .	2	13 42 29.734	2.374	+49 57 10.26	18.10
η Bootis . . .	3	13 48 35.446	2.859	+19 2 26.10	18.18
β Centauri . . .	1	13 54 48.582	+ 4.163	−59 45 14.93	−17.66

\* Circumpolar Stars.

MEAN PLACES FOR 1872.0. (Jan. 1—<sup>d</sup>680, Washington.)

Star's Name.	Magnitude.	Right Ascension.	An. Variation.	Declination.	An. Variation.
* $\alpha$ Draconis . . . . .	3.4	<sup>h</sup> 14 <sup>m</sup> 0 <sup>s</sup> 55.511	+ 1.623	+ 64° 59' 15".68	— 17.36
$\alpha$ Bootis ( <i>Arcturus</i> ) . . . . .	1	14 9 49.410	2.734	+ 19 51 0.75	18.89
$\theta$ Bootis . . . . .	4.3	14 20 50.315	+ 2.043	+ 52 26 36.00	16.78
* 5 Ursæ Minoris . . . . .	5.4	14 27 49.405	— 0.211	+ 76 15 52.54	16.05
$\alpha^2$ Centauri . . . . .	1	14 30 56.326	+ 4.033	— 60 18 9.56	15.04
$\epsilon$ Bootis . . . . .	2.3	14 39 23.846	+ 2.621	+ 27 36 54.83	— 15.37
$\alpha^2$ Libræ . . . . .	2.3	14 43 48.013	+ 3.307	— 15 30 28.90	15.20
* $\beta$ Ursæ Minoris . . . . .	2	14 51 6.139	— 0.249	+ 74 40 41.59	14.75
$\beta$ Bootis . . . . .	3	14 57 7.468	+ 2.260	+ 40 53 47.79	14.40
$\beta$ Libræ . . . . .	2	15 10 7.275	3.220	— 8 54 30.89	13.55
$\mu^1$ Bootis . . . . .	4.3	15 19 39.360	+ 2.268	+ 37 49 38.72	— 12.81
* $\gamma^2$ Ursæ Minoris . . . . .	3	15 20 56.929	— 0.147	+ 72 17 22.53	12.80
$\alpha$ Coronæ Borealis . . . . .	2	15 29 16.135	+ 2.539	+ 27 8 49.68	12.33
$\alpha$ Serpentis . . . . .	2.3	15 37 57.837	2.950	+ 6 49 48.90	11.59
$\epsilon$ Serpentis . . . . .	3.4	15 44 26.217	+ 2.987	+ 4 51 53.58	11.10
* $\zeta$ Ursæ Minoris . . . . .	4.5	15 48 40.773	— 2.287	+ 78 11 13.52	— 10.88
$\epsilon$ Coronæ Borealis . . . . .	4	15 52 17.413	+ 2.485	+ 27 15 1.24	10.64
$\delta$ Scorpii . . . . .	2.3	15 52 46.062	3.536	— 22 15 16.99	10.57
$\beta^1$ Scorpii . . . . .	2	15 57 59.787	3.477	— 19 27 10.33	10.20
* Groombridge 2320 . . . . .	6.5	16 5 58.728	0.133	+ 68 8 50.95	9.50
$\delta$ Ophiuchi . . . . .	3	16 7 38.340	+ 3.138	— 3 21 44.87	— 9.57
$\tau$ Herculis . . . . .	3.4	16 15 53.519	1.798	+ 46 37 9.45	8.77
$\alpha$ Scorpii ( <i>Antares</i> ) . . . . .	1.2	16 21 33.748	3.669	— 26 8 43.43	8.38
$\eta$ Draconis . . . . .	3.2	16 22 15.771	+ 0.804	+ 61 48 15.78	8.23
* $\Lambda$ Draconis . . . . .	5	16 28 14.666	— 0.142	+ 69 2 42.03	7.78
$\zeta$ Ophiuchi . . . . .	3.2	16 30 6.728	+ 3.298	— 10 18 19.07	— 7.62
* $\alpha$ Trianguli Australis . . . . .	2	16 35 8.121	6.283	— 68 47 18.76	7.34
$\eta$ Herculis . . . . .	3	16 38 30.499	2.054	+ 39 10 2.47	7.05
$\kappa$ Ophiuchi . . . . .	3.4	16 51 36.573	2.835	+ 9 34 34.49	5.87
$\delta$ Herculis . . . . .	5	16 56 52.699	+ 2.209	+ 33 45 19.50	5.42
* $\epsilon$ Ursæ Minoris . . . . .	4.5	16 59 10.049	— 6.385	+ 82 14 38.58	— 5.26
$\alpha^1$ Herculis . . . . .	var.	17 8 48.681	+ 2.733	+ 14 32 17.99	4.39
44 Ophiuchi . . . . .	5	17 18 33.260	3.659	— 24 3 15.76	3.69
$\beta$ Draconis . . . . .	3.2	17 27 32.425	1.351	+ 52 23 48.82	2.83
$\alpha$ Ophiuchi . . . . .	2	17 28 59.571	+ 2.782	+ 12 39 19.28	2.92
* $\omega$ Draconis . . . . .	5	17 37 42.187	— 0.356	+ 68 48 58.92	— 1.66
$\mu$ Herculis . . . . .	3.4	17 41 26.977	+ 2.345	+ 27 47 50.69	2.35
* $\varphi^1$ Draconis ( <i>pr.</i> ) . . . . .	4.5	17 44 13.131	— 1.082	+ 72 12 39.73	1.64
$\gamma$ Draconis . . . . .	2.3	17 53 38.189	+ 1.394	+ 51 30 17.21	0.59
$\gamma^2$ Sagittarii . . . . .	3.4	17 57 35.167	3.852	— 30 25 22.44	— 0.43
$\mu^1$ Sagittarii . . . . .	4	18 6 6.512	+ 3.586	— 21 5 22.62	+ 0.54
* $\sigma$ Octantis . . . . .	6	18 9 57.121	+ 109.091	— 89 16 41.44	0.87
* $\delta$ Ursæ Minoris . . . . .	4.5	18 13 37.558	— 19.406	+ 86 36 23.83	1.23
$\eta$ Serpentis . . . . .	3	18 14 41.148	+ 3.099	— 2 55 46.44	0.61
1 Aquilæ (3 H. Scuti) . . . . .	4.5	18 28 14.433	3.264	— 8 19 51.77	2.16
$\alpha$ Lyræ ( <i>Vega</i> ) . . . . .	1	18 32 36.275	+ 2.032	+ 38 39 57.25	+ 3.13
$\beta$ Lyræ . . . . .	var.	18 45 21.240	2.214	+ 33 12 55.94	3.93
$\sigma$ Sagittarii . . . . .	2.3	18 47 19.669	+ 3.724	— 26 27 10.05	4.05
* 50 Draconis . . . . .	6	18 50 29.318	— 1.898	+ 75 16 53.18	4.44
$\zeta$ Aquilæ . . . . .	3	18 59 31.540	+ 2.755	+ 13 40 30.92	+ 5.06

\* Circumpolar Stars.

MEAN PLACES FOR 1872.0. (Jan. 1—<sup>d</sup>680, Washington.)

Star's Name.	Magnitude.	Right Ascension.	An. Variation.	Declination.	An. Variation.
<i>d</i> Sagittarii . . . .	5	<sup>h</sup> 19 <sup>m</sup> 10 <sup>s</sup> 8.666	+ 3.513	—19° 10' 38.87	+ 6.08
* <i>δ</i> Draconis . . . .	3	19 12 31.173	+ 0.034	+67 26 10.44	6.31
* <i>τ</i> Draconis . . . .	5	19 18 0.039	— 1.107	+73 7 0.99	6.79
<i>δ</i> Aquilæ . . . .	3.4	19 19 2.609	+ 3.024	+ 2 51 42.32	6.87
* <i>κ</i> Aquilæ . . . .	5	19 30 0.232	3.230	— 7 18 34.27	7.70
<i>γ</i> Aquilæ . . . .	3	19 40 10.438	+ 2.853	+10 18 11.55	+ 8.50
<i>α</i> Aquilæ ( <i>Altair</i> ) . . . .	1.2	19 44 32.244	+ 2.928	+ 8 31 55.80	9.21
* <i>ε</i> Draconis . . . .	4	19 48 35.615	— 0.172	+69 56 29.54	9.15
<i>β</i> Aquilæ . . . .	4	19 49 1.510	+ 2.947	+ 6 5 20.33	8.71
* <i>λ</i> Ursæ Minoris . . . .	6.7	19 52 18.360	—59.760	+88 55 22.94	9.44
<i>τ</i> Aquilæ . . . .	6.5	19 57 53.200	+ 2.933	+ 6 55 7.22	+ 9.89
<i>α</i> <sup>2</sup> Capricorni . . . .	3.4	20 10 57.036	+ 3.333	—12 56 22.31	10.86
* <i>κ</i> Cephei . . . .	4.5	20 13 9.324	— 1.894	+77 19 28.14	11.01
<i>α</i> Pavonis . . . .	2	20 15 30.775	+ 4.794	—57 8 31.31	11.15
<i>π</i> Capricorni . . . .	5	20 19 59.541	3.441	—18 37 44.87	11.47
<i>ε</i> Delphini . . . .	4	20 27 5.823	+ 2.866	+10 52 11.63	+11.99
* Groombridge 3241 . . . .	6.7	20 30 32.517	— 0.208	+72 5 52.65	12.22
<i>α</i> Cygni . . . .	2.1	20 37 4.104	+ 2.044	+44 49 26.10	12.69
<i>μ</i> Aquarii . . . .	5.4	20 45 44.855	3.240	— 9 27 41.86	13.25
<i>ν</i> Cygni . . . .	4	20 52 24.080	+ 2.234	+40 40 32.67	13.72
* 12 Year Cat. 1879 . . . .	6	20 53 19.060	— 2.495	+80 4 14.39	+13.71
61 Cygni ( <i>pr.</i> ) . . . .	5.6	21 1 9.671	+ 2.687	+38 7 16.76	17.50
<i>ζ</i> Cygni . . . .	3	21 7 29.327	2.550	+29 42 11.24	14.58
<i>α</i> Cephei . . . .	3.2	21 15 31.391	1.437	+62 2 36.21	15.11
1 Pegasi . . . .	4.5	21 16 10.087	2.774	+19 15 30.28	15.23
<i>β</i> Aquarii . . . .	3	21 24 49.161	+ 3.164	— 6 7 57.61	+15.64
* <i>β</i> Cephei . . . .	3	21 26 59.960	0.800	+69 59 55.49	15.71
<i>ξ</i> Aquarii . . . .	5.4	21 30 56.163	3.198	— 8 25 36.31	15.94
<i>ε</i> Pegasi . . . .	2.3	21 37 53.976	2.948	+ 9 17 22.03	16.33
* 11 Cephei . . . .	5	21 40 2.362	0.907	+70 43 19.53	16.50
<i>μ</i> Capricorni . . . .	5	21 46 18.936	+ 3.279	—14 9 9.45	+16.77
* 79 Draconis . . . .	6.7	21 51 16.440	0.737	+73 5 48.32	16.96
<i>α</i> Aquarii . . . .	3	21 59 12.529	3.084	— 0 56 25.99	17.33
<i>α</i> Gruis . . . .	2	22 0 9.373	3.814	—47 34 45.59	17.19
<i>θ</i> Aquarii . . . .	4.5	22 10 4.679	3.170	— 8 25 10.42	17.78
<i>π</i> Aquarii . . . .	5.4	22 18 44.374	+ 3.065	+ 0 43 43.70	+18.13
<i>η</i> Aquarii . . . .	4.3	22 28 46.687	3.084	— 0 46 34.83	18.44
* 226 Cephei (B.) . . . .	5.6	22 30 1.093	1.083	+75 34 0.34	18.52
<i>ζ</i> Pegasi . . . .	3.4	22 35 4.649	2.988	+10 9 50.86	18.70
* <i>ι</i> Cephei . . . .	4.3	22 45 7.643	2.118	+65 31 38.76	18.85
<i>λ</i> Aquarii . . . .	4	22 45 56.083	+ 3.131	— 8 15 35.33	+19.07
<i>α</i> Pis. Aus. ( <i>Fomalhaut</i> ) . . . .	1.2	22 50 34.389	3.329	—30 17 59.18	18.99
<i>α</i> Pegasi ( <i>Markab</i> ) . . . .	2	22 58 23.149	2.984	+14 31 2.35	19.31
* <i>ο</i> Cephei . . . .	6.5	23 13 22.737	2.437	+67 24 39.78	19.62
<i>θ</i> Piscium . . . .	4.5	23 21 28.499	3.041	+ 5 40 35.43	19.75
<i>ι</i> Piscium . . . .	4.5	23 33 22.074	+ 3.085	+ 4 55 58.42	+19.48
* <i>γ</i> Cephei . . . .	3.4	23 34 6.600	2.403	+76 55 4.92	20.07
* Groombridge 4163 . . . .	7	23 48 37.774	2.849	+73 41 52.28	20.00
<i>ω</i> Piscium . . . .	4	23 52 44.362	+ 3.078	+ 6 9 17.51	+19.94

\* Circumpolar Stars.

**APPARENT PLACES OF  $\alpha$  URSÆ MINORIS, (*Polaris*), FOR THE UPPER TRANSIT  
AT WASHINGTON.**

Mean Solar Date.	JANUARY.		Mean Solar Date.	FEBRUARY.		Mean Solar Date.	MARCH.		Mean Solar Date.	APRIL.	
	Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.
	<sup>h</sup> <sup>m</sup> 1 11	88° 37'		<sup>h</sup> <sup>m</sup> 1 11	88° 37'		<sup>h</sup> <sup>m</sup> 1 10	88° 37'		<sup>h</sup> <sup>m</sup> 1 10	88° 37'
	<sup>s</sup>	"		<sup>s</sup>	"		<sup>s</sup>	"		<sup>s</sup>	"
0.3	57.37	50.9	1.2	28.32	51.0	1.1	67.02	45.9	1.0	56.95	37.2
1.3	56.40	51.0	2.2	27.55	50.9	2.1	66.55	45.7	2.0	56.83	36.9
2.3	55.47	51.1	3.2	26.80	50.8	3.1	66.05	45.5	3.0	56.69	36.6
3.3	54.59	51.1	4.2	26.04	50.7	4.1	65.52	45.3	4.0	56.55	36.3
4.3	53.76	51.2	5.2	25.24	50.7	5.1	64.96	45.1	5.0	56.43	36.0
5.3	52.95	51.3	6.2	24.40	50.6	6.1	64.37	44.8	6.0	56.38	35.6
6.3	52.15	51.3	7.2	23.50	50.5	7.1	63.77	44.6	7.0	56.38	35.3
7.2	51.34	51.4	8.2	22.57	50.4	8.1	63.18	44.3	8.0	56.45	35.0
8.2	50.49	51.5	9.2	21.64	50.2	9.1	62.62	44.0	9.0	56.59	34.6
9.2	49.60	51.6	10.2	20.72	50.1	10.1	62.12	43.7	10.0	56.76	34.3
10.2	48.65	51.7	11.2	19.84	49.9	11.1	61.69	43.4	11.0	56.96	34.0
11.2	47.66	51.8	12.2	19.01	49.7	12.1	61.32	43.1	12.0	57.17	33.7
12.2	46.64	51.8	13.1	18.25	49.5	13.1	61.03	42.8	13.0	57.36	33.4
13.2	45.59	51.9	14.1	17.54	49.3	14.1	60.75	42.5	14.0	57.53	33.2
14.2	44.58	51.9	15.1	16.88	49.1	15.1	60.50	42.2	15.0	57.66	32.9
15.2	43.58	51.8	16.1	16.24	48.9	16.1	60.24	41.9	16.0	57.76	32.6
16.2	42.64	51.8	17.1	15.60	48.8	17.1	59.95	41.7	17.0	57.83	32.4
17.2	41.76	51.8	18.1	14.95	48.6	18.1	59.63	41.4	18.0	57.92	32.1
18.2	40.92	51.7	19.1	14.27	48.5	19.1	59.27	41.2	19.0	58.05	31.8
19.2	40.10	51.7	20.1	13.54	48.3	20.1	58.90	40.9	20.0	58.23	31.4
20.2	39.29	51.7	21.1	12.79	48.1	21.1	58.52	40.6	21.0	58.49	31.1
21.2	38.47	51.7	22.1	12.01	47.9	22.0	58.16	40.3	22.0	58.80	30.8
22.2	37.61	51.7	23.1	11.22	47.7	23.0	57.85	39.9	23.0	59.19	30.5
23.2	36.71	51.7	24.1	10.45	47.5	24.0	57.59	39.6	24.0	59.60	30.2
24.2	35.76	51.7	25.1	9.73	47.2	25.0	57.41	39.3	25.0	60.04	29.9
25.2	34.77	51.7	26.1	9.08	47.0	26.0	57.29	38.9	25.9	60.47	29.7
26.2	33.78	51.6	27.1	8.50	46.7	27.0	57.22	38.6	26.9	60.87	29.4
27.2	32.75	51.6	28.1	7.98	46.4	28.0	57.18	38.3	27.9	61.23	29.2
28.2	31.77	51.5	29.1	7.49	46.2	29.0	57.15	38.0	28.9	61.56	29.0
29.2	30.83	51.4	30.1	7.02	45.9	30.0	57.12	37.7	29.9	61.87	28.7
30.2	29.94	51.3	31.1	6.55	45.7	31.0	57.06	37.5	30.9	62.17	28.5
31.2	29.10	51.1	32.1	6.05	45.5	32.0	56.95	37.2	31.9	62.48	28.2



APPARENT PLACES OF  $\alpha$  URSÆ MINORIS, (*Polaris*), FOR THE UPPER TRANSIT  
AT WASHINGTON.

Mean Solar Date.	MAY.		Mean Solar Date.	JUNE.		Mean Solar Date.	JULY.		Mean Solar Date.	AUGUST.	
	Right Ascension.	Declina- tion North.		Right Ascension.	Declina- tion North.		Right Ascension.	Declina- tion North.		Right Ascension.	Declina- tion North.
	<sup>h</sup> <sup>m</sup> 1 11	88° 37'		<sup>h</sup> <sup>m</sup> 1 11	88° 37'		<sup>h</sup> <sup>m</sup> 1 11	88° 37'		<sup>h</sup> <sup>m</sup> 1 12	88° 37'
1.9	<sup>s</sup> 2.48	28.2	1.9	<sup>s</sup> 21.66	22.1	1.8	<sup>s</sup> 47.49	20.9	1.7	<sup>s</sup> 14.60	24.8
2.9	2.84	28.0	2.8	22.53	22.0	2.8	48.48	20.9	2.7	15.35	25.0
3.9	3.25	27.7	3.8	23.42	21.8	3.8	49.45	21.0	3.7	16.06	25.3
4.9	3.72	27.4	4.8	24.32	21.7	4.8	50.37	21.1	4.7	16.75	25.5
5.9	4.26	27.1	5.8	25.21	21.6	5.8	51.24	21.2	5.7	17.43	25.7
6.9	4.85	26.8	6.8	26.08	21.6	6.8	52.06	21.3	6.7	18.13	25.9
7.9	5.48	26.6	7.8	26.89	21.5	7.8	52.86	21.4	7.7	18.86	26.1
8.9	6.10	26.4	8.8	27.67	21.5	8.7	53.63	21.4	8.7	19.65	26.3
9.9	6.72	26.2	9.8	28.40	21.4	9.7	54.43	21.5	9.7	20.47	26.5
10.9	7.31	26.0	10.8	29.12	21.3	10.7	55.25	21.6	10.7	21.33	26.7
11.9	7.85	25.8	11.8	29.85	21.3	11.7	56.12	21.6	11.7	22.19	27.0
12.9	8.36	25.6	12.8	30.60	21.2	12.7	57.05	21.7	12.7	23.03	27.2
13.9	8.84	25.4	13.8	31.40	21.1	13.7	58.02	21.7	13.7	23.84	27.5
14.9	9.33	25.2	14.8	32.25	21.0	14.7	59.00	21.8	14.6	24.59	27.8
15.9	9.83	25.0	15.8	33.15	20.9	15.7	59.99	22.0	15.6	25.28	28.1
16.9	10.38	24.7	16.8	34.11	20.8	16.7	60.97	22.1	16.6	25.93	28.4
17.9	10.98	24.5	17.8	35.08	20.8	17.7	61.90	22.3	17.6	26.53	28.7
18.9	11.65	24.3	18.8	36.05	20.8	18.7	62.78	22.4	18.6	27.11	28.9
19.9	12.37	24.1	19.8	37.00	20.8	19.7	63.61	22.6	19.6	27.69	29.2
20.9	13.13	23.9	20.8	37.91	20.8	20.7	64.40	22.8	20.6	28.31	29.4
21.9	13.91	23.7	21.8	38.78	20.8	21.7	65.15	22.9	21.6	28.95	29.7
22.9	14.69	23.5	22.8	39.60	20.8	22.7	65.90	23.1	22.6	29.64	29.9
23.9	15.45	23.4	23.8	40.39	20.9	23.7	66.67	23.2	23.6	30.37	30.2
24.9	16.17	23.3	24.8	41.17	20.9	24.7	67.47	23.3	24.6	31.11	30.5
25.9	16.84	23.2	25.8	41.95	20.9	25.7	68.32	23.5	25.6	31.85	30.8
26.9	17.49	23.0	26.8	42.77	20.8	26.7	69.21	23.6	26.6	32.57	31.1
27.9	18.11	22.9	27.8	43.62	20.8	27.7	70.15	23.8	27.6	33.24	31.5
28.9	18.74	22.8	28.8	44.53	20.8	28.7	71.09	23.9	28.6	33.86	31.8
29.9	19.40	22.6	29.8	45.49	20.8	29.7	72.03	24.1	29.6	34.42	32.1
30.9	20.10	22.4	30.8	46.49	20.8	30.7	72.94	24.4	30.6	34.93	32.5
31.9	20.86	22.3	31.8	47.49	20.9	31.7	73.79	24.6	31.6	35.40	32.8
32.9	21.66	22.1	32.8	48.48	20.9	32.7	74.60	24.8	32.6	35.85	33.1

APPARENT PLACES OF  $\alpha$  URSÆ MINORIS, (*Polaris*), FOR THE UPPER TRANSIT  
AT WASHINGTON.

Mean Solar Date.	SEPTEMBER.		Mean Solar Date.	OCTOBER.		Mean Solar Date.	NOVEMBER.		Mean Solar Date.	DECEMBER.	
	Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.
	<sup>h</sup> <sup>m</sup> 1 12	88° 37'		<sup>h</sup> <sup>m</sup> 1 12	88° 37'		<sup>h</sup> <sup>m</sup> 1 12	88° 37'		<sup>h</sup> <sup>m</sup> 1 12	88° 38'
1.6	35.85	33.1	1.5	47.32	43.8	1.4	47.19	55.7	1.3	34.17	5.6
2.6	36.31	33.4	2.5	47.55	44.2	2.4	47.05	56.0	2.3	33.54	6.0
3.6	36.79	33.7	3.5	47.80	44.5	3.4	46.87	56.4	3.3	32.84	6.3
4.6	37.33	34.0	4.5	48.07	44.9	4.4	46.64	56.8	4.3	32.09	6.6
5.6	37.89	34.3	5.5	48.34	45.3	5.4	46.35	57.2	5.3	31.30	6.8
6.6	38.50	34.6	6.5	48.58	45.7	6.4	45.99	57.6	6.3	30.50	7.1
7.6	39.10	35.0	7.5	48.78	46.1	7.4	45.59	58.0	7.3	29.72	7.3
8.6	39.69	35.3	8.5	48.91	46.5	8.4	45.15	58.4	8.3	28.97	7.5
9.6	40.25	35.7	9.5	48.96	47.0	9.4	44.79	58.7	9.3	28.26	7.7
10.6	40.77	36.1	10.5	48.97	47.4	10.4	44.28	59.1	10.3	27.58	7.9
11.6	41.23	36.5	11.5	48.93	47.8	11.4	43.87	59.4	11.3	26.94	8.1
12.6	41.62	36.8	12.5	48.88	48.2	12.4	43.50	59.7	12.3	26.29	8.4
13.6	41.96	37.2	13.5	48.83	48.5	13.4	43.17	60.0	13.3	25.64	8.6
14.6	42.27	37.6	14.5	48.80	48.9	14.4	42.86	60.3	14.3	24.96	8.8
15.6	42.57	37.9	15.5	48.80	49.2	15.4	42.55	60.7	15.3	24.22	9.1
16.6	42.89	38.3	16.5	48.83	49.6	16.4	42.21	61.0	16.3	23.43	9.3
17.6	43.24	38.6	17.5	48.91	50.0	17.4	41.83	61.4	17.3	22.58	9.5
18.6	43.61	38.9	18.5	48.98	50.3	18.4	41.40	61.7	18.3	21.69	9.7
19.6	44.03	39.3	19.5	49.05	50.7	19.4	40.90	62.1	19.3	20.77	9.9
20.5	44.47	39.6	20.5	49.09	51.1	20.4	40.34	62.4	20.3	19.84	10.1
21.5	44.93	40.0	21.5	49.08	51.6	21.4	39.74	62.8	21.3	18.93	10.2
22.5	45.35	40.4	22.5	49.00	52.0	22.4	39.10	63.1	22.3	18.05	10.4
23.5	45.74	40.8	23.5	48.86	52.4	23.4	38.47	63.4	23.3	17.23	10.5
24.5	46.08	41.2	24.5	48.66	52.8	24.4	37.85	63.7	24.3	16.44	10.6
25.5	46.35	41.6	25.5	48.43	53.2	25.4	37.27	63.9	25.3	15.69	10.8
26.5	46.57	42.0	26.4	48.18	53.6	26.4	36.74	64.2	26.3	14.94	10.9
27.5	46.73	42.4	27.4	47.94	53.9	27.4	36.24	64.5	27.3	14.17	11.1
28.5	46.87	42.8	28.4	47.73	54.3	28.4	35.76	64.7	28.3	13.38	11.2
29.5	46.99	43.1	29.4	47.55	54.6	29.4	35.27	65.0	29.3	12.53	11.4
30.5	47.14	43.5	30.4	47.41	54.9	30.4	34.75	65.3	30.3	11.62	11.5
31.5	47.32	43.8	31.4	47.30	55.3	31.3	34.17	65.6	31.3	10.67	11.7
32.5	47.55	44.2	32.4	47.19	55.7	32.3	33.54	66.0	32.3	9.68	11.8

**APPARENT PLACES OF 51 CEPHEI, (*Hec.*), FOR THE UPPER TRANSIT  
AT WASHINGTON.**

Mean Solar Date.	JANUARY.		Mean Solar Date.	FEBRUARY.		Mean Solar Date.	MARCH.		Mean Solar Date.	APRIL.	
	Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.
	<sup>h</sup> <sup>m</sup> 6 40	87° 14'		<sup>h</sup> <sup>m</sup> 6 39	87° 14'		<sup>h</sup> <sup>m</sup> 6 39	87° 14'		<sup>h</sup> <sup>m</sup> 6 39	87° 14'
0.5	<sup>s</sup> 2.25	17.1	1.4	<sup>s</sup> 60.79	27.3	1.3	<sup>s</sup> 52.59	34.1	1.2	<sup>s</sup> 40.08	36.5
1.5	2.30	17.4	2.4	60.61	27.5	2.3	52.26	34.3	2.2	39.69	36.5
2.5	2.33	17.8	3.4	60.45	27.8	3.3	51.94	34.4	3.2	39.29	36.6
3.5	2.37	18.1	4.4	60.29	28.1	4.3	51.62	34.6	4.2	38.85	36.6
4.5	2.42	18.4	5.4	60.14	28.3	5.3	51.29	34.8	5.2	38.39	36.6
5.5	2.46	18.7	6.4	59.97	28.6	6.3	50.92	34.9	6.2	37.93	36.5
6.5	2.53	19.0	7.4	59.80	28.9	7.3	50.53	35.1	7.2	37.46	36.5
7.5	2.61	19.3	8.4	59.58	29.2	8.3	50.12	35.3	8.2	37.01	36.4
8.5	2.71	19.6	9.4	59.34	29.6	9.3	49.67	35.4	9.2	36.56	36.3
9.5	2.79	19.9	10.4	59.06	29.9	10.3	49.22	35.6	10.2	36.15	36.2
10.5	2.86	20.3	11.4	58.76	30.1	11.3	48.76	35.7	11.2	35.76	36.1
11.5	2.91	20.6	12.4	58.44	30.4	12.3	48.31	35.7	12.2	35.40	36.0
12.5	2.92	21.0	13.4	58.12	30.6	13.3	47.88	35.8	13.2	35.06	35.9
13.5	2.89	21.4	14.4	57.80	30.8	14.3	47.47	35.9	14.2	34.72	35.8
14.5	2.83	21.7	15.4	57.50	31.0	15.3	47.09	35.9	15.2	34.38	35.8
15.5	2.74	22.1	16.4	57.23	31.2	16.3	46.71	36.0	16.2	34.02	35.7
16.5	2.65	22.4	17.4	56.96	31.5	17.3	46.35	36.1	17.2	33.63	35.6
17.5	2.55	22.7	18.4	56.71	31.7	18.3	45.98	36.1	18.2	33.23	35.6
18.4	2.47	23.0	19.4	56.46	31.9	19.3	45.61	36.2	19.2	32.81	35.5
19.4	2.41	23.3	20.4	56.20	32.2	20.3	45.20	36.3	20.2	32.37	35.4
20.4	2.36	23.5	21.4	55.91	32.4	21.3	44.78	36.4	21.2	31.95	35.2
21.4	2.32	23.8	22.4	55.61	32.7	22.3	44.33	36.5	22.2	31.53	35.1
22.4	2.28	24.1	23.4	55.26	32.9	23.3	43.85	36.6	23.2	31.15	34.9
23.4	2.24	24.5	24.3	54.88	33.1	24.3	43.37	36.6	24.2	30.79	34.7
24.4	2.18	24.8	25.3	54.48	33.4	25.3	42.90	36.6	25.2	30.45	34.5
25.4	2.08	25.1	26.3	54.08	33.5	26.3	42.43	36.6	26.2	30.15	34.4
26.4	1.96	25.5	27.3	53.67	33.7	27.3	41.99	36.6	27.2	29.86	34.2
27.4	1.81	25.8	28.3	53.30	33.9	28.3	41.58	36.6	28.2	29.57	34.0
28.4	1.62	26.2	29.3	52.94	34.0	29.3	41.19	36.5	29.2	29.28	33.9
29.4	1.42	26.5	30.3	52.59	34.1	30.3	40.81	36.5	30.2	28.97	33.8
30.4	1.20	26.8	31.3	52.26	34.3	31.3	40.45	36.5	31.2	28.65	33.6
31.4	0.99	27.0	32.3	51.94	34.4	32.2	40.08	36.5	32.2	28.30	33.5

APPARENT PLACES OF 51 CEPHEI, (*Hec.*), FOR THE UPPER TRANSIT  
AT WASHINGTON.

Mean Solar Date.	MAY.		Mean Solar Date.	JUNE.		Mean Solar Date.	JULY.		Mean Solar Date.	AUGUST.	
	Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.
	<sup>h</sup> <sup>m</sup> 6 39	<sup>°</sup> <sup>'</sup> 87 14		<sup>h</sup> <sup>m</sup> 6 39	<sup>°</sup> <sup>'</sup> 87 14		<sup>h</sup> <sup>m</sup> 6 39	<sup>°</sup> <sup>'</sup> 87 14		<sup>h</sup> <sup>m</sup> 6 39	<sup>°</sup> <sup>'</sup> 87 14
1.2	28.65	33.6	1.1	21.54	26.4	1.0	21.55	17.3	1.9	29.24	8.1
2.2	28.30	33.5	2.1	21.39	26.1	2.0	21.69	17.0	2.9	29.63	7.9
3.2	27.93	33.3	3.1	21.26	25.7	3.0	21.85	16.6	3.9	29.99	7.7
4.2	27.57	33.1	4.1	21.17	25.4	4.0	22.04	16.3	4.9	30.34	7.5
5.2	27.21	32.9	5.1	21.10	25.1	5.0	22.23	16.0	5.9	30.67	7.3
6.2	26.87	32.7	6.1	21.06	24.8	6.0	22.43	15.7	6.9	30.98	7.1
7.2	26.57	32.5	7.1	21.04	24.5	7.0	22.64	15.5	7.9	31.29	6.9
8.1	26.29	32.2	8.1	21.04	24.2	8.0	22.82	15.2	8.9	31.62	6.6
9.1	26.05	32.0	9.1	21.02	23.9	9.0	22.98	15.0	9.9	31.96	6.3
10.1	25.83	31.7	10.1	20.99	23.6	10.0	23.12	14.7	10.9	32.33	6.1
11.1	25.61	31.5	11.1	20.95	23.4	11.0	23.25	14.4	11.9	32.74	5.8
12.1	25.40	31.3	12.1	20.89	23.1	12.0	23.39	14.1	12.9	33.17	5.6
13.1	25.19	31.1	13.1	20.83	22.9	13.0	23.54	13.8	13.9	33.62	5.3
14.1	24.97	30.9	14.0	20.75	22.6	14.0	23.72	13.5	14.9	34.09	5.1
15.1	24.71	30.7	15.0	20.69	22.3	15.0	23.94	13.1	15.9	34.55	4.9
16.1	24.45	30.5	16.0	20.65	21.9	16.0	24.19	12.8	16.9	35.00	4.8
17.1	24.17	30.3	17.0	20.63	21.6	17.0	24.46	12.5	17.9	35.44	4.6
18.1	23.89	30.1	18.0	20.64	21.2	18.0	24.75	12.2	18.9	35.85	4.4
19.1	23.63	29.8	19.0	20.69	20.9	19.0	25.06	11.9	19.9	36.25	4.3
20.1	23.38	29.5	20.0	20.77	20.6	19.9	25.37	11.7	20.9	36.64	4.1
21.1	23.17	29.2	21.0	20.87	20.3	20.9	25.65	11.4	21.9	37.04	3.9
22.1	23.00	28.9	22.0	20.98	20.0	21.9	25.92	11.2	22.9	37.45	3.7
23.1	22.86	28.7	23.0	21.08	19.7	22.9	26.18	10.9	23.9	37.86	3.5
24.1	22.74	28.4	24.0	21.17	19.4	23.9	26.43	10.7	24.9	38.31	3.2
25.1	22.63	28.1	25.0	21.23	19.2	24.9	26.65	10.4	25.9	38.77	3.0
26.1	22.52	27.9	26.0	21.26	18.9	25.9	26.88	10.1	26.8	39.27	2.8
27.1	22.39	27.6	27.0	21.29	18.6	26.9	27.14	9.8	27.8	39.80	2.6
28.1	22.23	27.4	28.0	21.32	18.3	27.9	27.43	9.5	28.8	40.32	2.5
29.1	22.08	27.2	29.0	21.37	18.0	28.9	27.74	9.2	29.8	40.85	2.3
30.1	21.90	26.9	30.0	21.45	17.7	29.9	28.09	8.9	30.8	41.36	2.2
31.1	21.72	26.6	31.0	21.55	17.3	30.9	28.46	8.7	31.8	41.84	2.1
32.1	21.54	26.4	32.0	21.69	17.0	31.9	28.85	8.4	32.8	42.31	2.0

APPARENT PLACES OF 51 CEPHEI, (*Hec.*) FOR THE UPPER TRANSIT  
AT WASHINGTON.

Mean Solar Date.	SEPTEMBER.		Mean Solar Date.	OCTOBER.		Mean Solar Date.	NOVEMBER.		Mean Solar Date.	DECEMBER.	
	Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.
	<sup>h</sup> <sup>m</sup> 6 39	<sup>°</sup> <sup>'</sup> 87 13		<sup>h</sup> <sup>m</sup> 6 39	<sup>°</sup> <sup>'</sup> 87 13		<sup>h</sup> <sup>m</sup> 6 40	<sup>°</sup> <sup>'</sup> 87 14		<sup>h</sup> <sup>m</sup> 6 40	<sup>°</sup> <sup>'</sup> 87 14
1.8	<sup>s</sup> 42.31	<sup>"</sup> 62.0	1.7	<sup>s</sup> 57.92	<sup>"</sup> 59.5	1.7	<sup>s</sup> 14.36	<sup>"</sup> 1.3	1.6	<sup>s</sup> 27.51	<sup>"</sup> 7.3
2.8	42.76	61.9	2.7	58.42	59.5	2.7	14.89	1.4	2.6	27.91	7.5
3.8	43.19	61.7	3.7	58.92	59.5	3.7	15.44	1.5	3.6	28.29	7.8
4.8	43.63	61.6	4.7	59.46	59.4	4.7	15.99	1.6	4.6	28.64	8.1
5.8	44.08	61.4	5.7	60.02	59.4	5.7	16.53	1.8	5.6	28.96	8.5
6.8	44.56	61.3	6.7	60.61	59.4	6.7	17.06	2.0	6.6	29.26	8.8
7.8	45.07	61.1	7.7	61.21	59.3	7.6	17.56	2.2	7.6	29.52	9.1
8.8	45.60	60.9	8.7	61.82	59.4	8.6	18.03	2.4	8.6	29.77	9.4
9.8	46.16	60.8	9.7	62.42	59.4	9.6	18.46	2.6	9.6	30.00	9.6
10.8	46.73	60.7	10.7	62.99	59.5	10.6	18.88	2.8	10.6	30.25	9.9
11.8	47.30	60.6	11.7	63.54	59.5	11.6	19.28	3.0	11.6	30.51	10.2
12.8	47.86	60.5	12.7	64.07	59.6	12.6	19.69	3.1	12.6	30.78	10.4
13.8	48.40	60.5	13.7	64.57	59.7	13.6	20.12	3.3	13.6	31.07	10.7
14.8	48.92	60.4	14.7	65.06	59.7	14.6	20.55	3.5	14.5	31.36	11.0
15.8	49.41	60.3	15.7	65.54	59.8	15.6	21.02	3.6	15.5	31.67	11.2
16.8	49.89	60.3	16.7	66.04	59.8	16.6	21.49	3.8	16.5	31.96	11.6
17.8	50.37	60.2	17.7	66.55	59.8	17.6	21.99	4.0	17.5	32.24	11.9
18.8	50.84	60.1	18.7	67.09	59.9	18.6	22.47	4.2	18.5	32.47	12.3
19.8	51.34	60.0	19.7	67.64	59.9	19.6	22.95	4.4	19.5	32.68	12.6
20.8	51.86	59.9	20.7	68.21	59.9	20.6	23.41	4.7	20.5	32.85	13.0
21.8	52.40	59.8	21.7	68.80	60.0	21.6	23.84	4.9	21.5	33.00	13.3
22.8	52.98	59.7	22.7	69.39	60.1	22.6	24.23	5.2	22.5	33.13	13.6
23.8	53.57	59.6	23.7	69.96	60.2	23.6	24.59	5.5	23.5	33.26	13.9
24.8	54.16	59.6	24.7	70.50	60.4	24.6	24.92	5.7	24.5	33.39	14.2
25.8	54.75	59.6	25.7	71.02	60.5	25.6	25.26	5.9	25.5	33.53	14.5
26.8	55.34	59.6	26.7	71.51	60.6	26.6	25.59	6.2	26.5	33.70	14.8
27.8	55.90	59.6	27.7	71.99	60.8	27.6	25.94	6.4	27.5	33.87	15.0
28.8	56.42	59.6	28.7	72.45	60.9	28.6	26.32	6.6	28.5	34.06	15.4
29.8	56.94	59.6	29.7	72.91	61.0	29.6	26.71	6.8	29.5	34.25	15.7
30.8	57.44	59.6	30.7	73.38	61.1	30.6	27.11	7.0	30.5	34.42	16.0
31.7	57.92	59.5	31.7	73.86	61.2	31.6	27.51	7.3	31.5	34.56	16.4
32.7	58.42	59.5	32.7	74.36	61.3	32.6	27.91	7.5	32.5	34.67	16.7

## APPARENT PLACES OF $\delta$ URSÆ MINORIS, FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	JANUARY.		Mean Solar Date.	FEBRUARY.		Mean Solar Date.	MARCH.		Mean Solar Date.	APRIL.	
	Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.
	<sup>h</sup> 18 13	<sup>m</sup> 86 36		<sup>h</sup> 18 13	<sup>m</sup> 86 36		<sup>h</sup> 18 13	<sup>m</sup> 86 36		<sup>h</sup> 18 13	<sup>m</sup> 86 36
1.0	20.97	19.9	1.9	24.15	9.6	1.8	32.13	3.3	1.7	42.91	2.0
2.0	21.00	19.6	2.9	24.35	9.3	2.8	32.43	3.2	2.7	43.25	2.0
3.0	21.02	19.2	3.9	24.53	9.1	3.8	32.73	3.1	3.7	43.61	2.0
4.0	21.05	18.9	4.9	24.71	8.8	4.8	33.04	2.9	4.7	43.97	2.1
5.0	21.06	18.6	5.9	24.90	8.5	5.8	33.36	2.8	5.7	44.35	2.1
6.0	21.06	18.3	6.9	25.10	8.2	6.8	33.69	2.6	6.7	44.72	2.2
7.0	21.07	18.0	7.9	25.31	7.9	7.8	34.05	2.5	7.7	45.10	2.3
8.0	21.07	17.7	8.9	25.55	7.6	8.8	34.43	2.3	8.7	45.46	2.5
9.0	21.07	17.3	9.9	25.81	7.3	9.8	34.81	2.2	9.7	45.80	2.6
10.0	21.08	17.0	10.9	26.09	7.1	10.8	35.20	2.2	10.7	46.12	2.7
11.0	21.10	16.6	11.9	26.38	6.8	11.8	35.58	2.1	11.7	46.43	2.9
11.9	21.15	16.2	12.9	26.68	6.6	12.8	35.95	2.1	12.7	46.73	3.0
12.9	21.23	15.8	13.9	26.97	6.4	13.8	36.31	2.0	13.7	47.01	3.2
13.9	21.32	15.4	14.9	27.26	6.2	14.8	36.65	2.0	14.7	47.30	3.3
14.9	21.43	15.1	15.9	27.54	6.0	15.8	36.97	2.0	15.7	47.60	3.4
15.9	21.56	14.8	16.9	27.80	5.8	16.8	37.29	1.9	16.7	47.90	3.5
16.9	21.68	14.4	17.8	28.06	5.6	17.8	37.62	1.9	17.7	48.22	3.6
17.9	21.80	14.1	18.8	28.31	5.4	18.8	37.95	1.8	18.7	48.54	3.7
18.9	21.92	13.9	19.8	28.57	5.2	19.8	38.29	1.8	19.7	48.88	3.8
19.9	22.03	13.6	20.8	28.84	5.0	20.8	38.65	1.7	20.7	49.21	4.0
20.9	22.13	13.3	21.8	29.13	4.7	21.8	39.03	1.7	21.7	49.53	4.2
21.9	22.23	13.0	22.8	29.45	4.5	22.8	39.42	1.6	22.7	49.84	4.4
22.9	22.33	12.6	23.8	29.78	4.3	23.8	39.80	1.6	23.7	50.14	4.6
23.9	22.44	12.3	24.8	30.12	4.1	24.8	40.20	1.6	24.7	50.41	4.8
24.9	22.57	12.0	25.8	30.48	3.9	25.7	40.58	1.7	25.7	50.66	5.0
25.9	22.72	11.6	26.8	30.83	3.8	26.7	40.96	1.7	26.7	50.90	5.2
26.9	22.89	11.3	27.8	31.17	3.6	27.7	41.31	1.8	27.7	51.13	5.4
27.9	23.09	10.9	28.8	31.50	3.5	28.7	41.64	1.8	28.7	51.36	5.6
28.9	23.30	10.6	29.8	31.82	3.4	29.7	41.96	1.9	29.7	51.60	5.8
29.9	23.52	10.3	30.8	32.13	3.3	30.7	42.27	1.9	30.7	51.86	5.9
30.9	23.74	10.0	31.8	32.43	3.2	31.7	42.59	2.0	31.7	52.13	6.1
31.9	23.95	9.8	32.8	32.73	3.1	32.7	42.91	2.0	32.7	52.40	6.3

APPARENT PLACES OF  $\delta$  URSÆ MINORIS, FOR THE UPPER TRANSIT  
AT WASHINGTON.

Mean Solar Date.	MAY.		Mean Solar Date.	JUNE.		Mean Solar Date.	JULY.		Mean Solar Date.	AUGUST.	
	Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.
	<sup>h</sup> 18	<sup>m</sup> 13		<sup>h</sup> 18	<sup>m</sup> 13		<sup>h</sup> 18	<sup>m</sup> 13		<sup>h</sup> 18	<sup>m</sup> 13
		<sup>s</sup> 86° 36'			<sup>s</sup> 86° 36'			<sup>s</sup> 86° 36'			<sup>s</sup> 86° 36'
1.6	52.13	6.1	1.6	57.33	14.4	1.5	56.62	23.9	1.4	50.07	32.5
2.6	52.40	6.3	2.6	57.42	14.7	2.5	56.49	24.2	2.4	49.75	32.7
3.6	52.68	6.5	3.6	57.49	15.1	3.5	56.33	24.5	3.4	49.43	32.9
4.6	52.94	6.7	4.6	57.54	15.4	4.5	56.16	24.8	4.4	49.13	33.1
5.6	53.20	7.0	5.6	57.57	15.8	5.5	55.99	25.1	5.4	48.84	33.2
6.6	53.45	7.3	6.6	57.57	16.1	6.5	55.81	25.4	6.4	48.56	33.4
7.6	53.67	7.5	7.5	57.58	16.4	7.5	55.65	25.6	7.4	48.28	33.6
8.6	53.87	7.8	8.5	57.58	16.7	8.5	55.50	25.9	8.4	48.00	33.9
9.6	54.05	8.1	9.5	57.58	17.0	9.5	55.36	26.2	9.4	47.70	34.1
10.6	54.22	8.4	10.5	57.59	17.2	10.5	55.22	26.4	10.4	47.39	34.4
11.6	54.38	8.6	11.5	57.61	17.5	11.5	55.08	26.7	11.4	47.05	34.6
12.6	54.55	8.8	12.5	57.64	17.8	12.5	54.93	27.0	12.4	46.70	34.8
13.6	54.72	9.0	13.5	57.67	18.1	13.4	54.76	27.3	13.4	46.33	35.0
14.6	54.90	9.3	14.5	57.70	18.4	14.4	54.58	27.7	14.4	45.95	35.2
15.6	55.10	9.5	15.5	57.72	18.7	15.4	54.37	28.0	15.4	45.57	35.4
16.6	55.30	9.7	16.5	57.72	19.1	16.4	54.16	28.3	16.4	45.19	35.6
17.6	55.51	10.0	17.5	57.69	19.5	17.4	53.90	28.6	17.4	44.83	35.7
18.6	55.70	10.3	18.5	57.63	19.8	18.4	53.64	28.9	18.4	44.48	35.8
19.6	55.88	10.6	19.5	57.57	20.2	19.4	53.39	29.1	19.3	44.16	36.0
20.6	56.04	10.9	20.5	57.48	20.5	20.4	53.14	29.4	20.3	43.82	36.1
21.6	56.17	11.3	21.5	57.40	20.8	21.4	52.90	29.6	21.3	43.47	36.3
22.6	56.29	11.6	22.5	57.31	21.1	22.4	52.68	29.8	22.3	43.14	36.5
23.6	56.40	11.9	23.5	57.22	21.4	23.4	52.47	30.1	23.3	42.78	36.6
24.6	56.50	12.2	24.5	57.15	21.6	24.4	52.25	30.3	24.3	42.41	36.8
25.6	56.58	12.4	25.5	57.00	21.9	25.4	52.04	30.6	25.3	42.02	37.0
26.6	56.67	12.7	26.5	57.04	22.2	26.4	51.81	30.9	26.3	41.62	37.2
27.6	56.78	13.0	27.5	56.99	22.5	27.4	51.57	31.1	27.3	41.20	37.4
28.6	56.88	13.2	28.5	56.92	22.8	28.4	51.30	31.4	28.3	40.77	37.5
29.6	56.99	13.5	29.5	56.85	23.2	29.4	51.02	31.7	29.3	40.35	37.6
30.6	57.11	13.8	30.5	56.75	23.5	30.4	50.71	32.0	30.3	39.94	37.7
31.6	57.23	14.1	31.5	56.62	23.9	31.4	50.39	32.2	31.3	39.53	37.8
32.6	57.33	14.4	32.5	56.49	24.2	32.4	50.07	32.5	32.3	39.14	37.9

## APPARENT PLACES OF $\delta$ URSÆ MINORIS, FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	SEPTEMBER.		Mean Solar Date.	OCTOBER.		Mean Solar Date.	NOVEMBER.		Mean Solar Date.	DECEMBER.	
	Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.
	<sup>h</sup> <sup>m</sup> 18 13	<sup>°</sup> <sup>'</sup> 86 36		<sup>h</sup> <sup>m</sup> 18 13	<sup>°</sup> <sup>'</sup> 86 36		<sup>h</sup> <sup>m</sup> 18 13	<sup>°</sup> <sup>'</sup> 86 36		<sup>h</sup> <sup>m</sup> 18 13	<sup>°</sup> <sup>'</sup> 86 36
	<sup>s</sup>	<sup>"</sup>		<sup>s</sup>	<sup>"</sup>		<sup>s</sup>	<sup>"</sup>		<sup>s</sup>	<sup>"</sup>
1.3	39.14	37.9	1.2	26.51	39.1	1.1	13.80	35.9	1.1	4.51	28.5
2.3	38.76	37.9	2.2	26.10	39.1	2.1	13.41	35.7	2.1	4.24	28.2
3.3	38.39	38.0	3.2	25.70	39.1	3.1	13.02	35.5	3.1	3.99	27.9
4.3	38.01	38.1	4.2	25.27	39.1	4.1	12.62	35.4	4.1	3.76	27.5
5.3	37.63	38.3	5.2	24.83	39.1	5.1	12.23	35.1	5.1	3.54	27.2
6.3	37.24	38.4	6.2	24.38	39.0	6.1	11.84	34.9	6.1	3.35	26.8
7.3	36.84	38.5	7.2	23.92	39.0	7.1	11.47	34.7	7.0	3.18	26.5
8.3	36.42	38.6	8.2	23.46	38.9	8.1	11.12	34.4	8.0	3.02	26.1
9.3	35.97	38.7	9.2	22.99	38.9	9.1	10.79	34.2	9.0	2.88	25.8
10.3	35.52	38.8	10.2	22.55	38.7	10.1	10.48	33.9	10.0	2.74	25.5
11.3	35.06	38.9	11.2	22.11	38.6	11.1	10.18	33.7	11.0	2.59	25.2
12.3	34.61	38.9	12.2	21.70	38.5	12.1	9.88	33.5	12.0	2.43	25.0
13.3	34.17	39.0	13.2	21.30	38.4	13.1	9.58	33.3	13.0	2.26	24.7
14.3	33.75	39.0	14.2	20.91	38.3	14.1	9.27	33.1	14.0	2.08	24.4
15.3	33.34	39.0	15.2	20.53	38.2	15.1	8.94	32.9	15.0	1.90	24.0
16.3	32.93	39.0	16.2	20.15	38.1	16.1	8.62	32.6	16.0	1.74	23.7
17.3	32.55	39.0	17.2	19.75	38.0	17.1	8.28	32.4	17.0	1.58	23.3
18.3	32.15	39.1	18.2	19.35	37.9	18.1	7.94	32.2	18.0	1.44	23.0
19.3	31.75	39.1	19.2	18.92	37.9	19.1	7.61	31.9	19.0	1.33	22.6
20.3	31.34	39.2	20.2	18.49	37.8	20.1	7.29	31.6	20.0	1.25	22.2
21.3	30.91	39.3	21.2	18.04	37.7	21.1	6.99	31.3	21.0	1.18	21.8
22.3	30.46	39.3	22.2	17.61	37.5	22.1	6.72	31.0	22.0	1.12	21.5
23.3	30.00	39.3	23.2	17.18	37.3	23.1	6.46	30.7	23.0	1.08	21.2
24.3	29.53	39.4	24.2	16.76	37.2	24.1	6.21	30.4	24.0	1.02	20.8
25.2	29.06	39.4	25.2	16.35	37.0	25.1	5.98	30.1	25.0	0.97	20.5
26.2	28.61	39.3	26.2	15.96	36.8	26.1	5.75	29.8	26.0	0.91	20.2
27.2	28.15	39.3	27.2	15.60	36.6	27.1	5.52	29.6	27.0	0.84	19.9
28.2	27.72	39.2	28.2	15.24	36.4	28.1	5.28	29.3	28.0	0.77	19.6
29.2	27.30	39.2	29.2	14.89	36.3	29.1	5.03	29.1	29.0	0.69	19.2
30.2	26.90	39.1	30.2	14.54	36.1	30.1	4.77	28.8	30.0	0.63	18.9
31.2	26.51	39.1	31.2	14.18	36.0	31.1	4.51	28.5	31.0	0.58	18.5
32.2	26.10	39.1	32.1	13.80	35.9	32.1	4.24	28.2	32.0	0.56	18.1



**APPARENT PLACES OF  $\lambda$  URSÆ MINORIS, FOR THE UPPER TRANSIT  
AT WASHINGTON**

Mean Solar Date.	JANUARY.		Mean Solar Date.	FEBRUARY.		Mean Solar Date.	MARCH.		Mean Solar Date.	APRIL.	
	Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.
	<sup>h</sup> <sup>m</sup> 19 51	<sup>°</sup> <sup>'</sup> 88 55		<sup>h</sup> <sup>m</sup> 19 51	<sup>°</sup> <sup>'</sup> 88 55		<sup>h</sup> <sup>m</sup> 19 51	<sup>°</sup> <sup>'</sup> 88 55		<sup>h</sup> <sup>m</sup> 19 52	<sup>°</sup> <sup>'</sup> 88 55
1.1	<sup>s</sup> 27.12	<sup>"</sup> 25.2	1.0	<sup>s</sup> 20.51	<sup>"</sup> 15.1	1.9	<sup>s</sup> 34.13	<sup>"</sup> 6.4	1.8	<sup>s</sup> 2.65	<sup>"</sup> 1.3
2.1	26.66	24.9	2.0	20.72	14.8	2.9	34.80	6.2	2.8	3.63	1.2
3.1	26.25	24.6	3.0	20.90	14.6	3.9	35.44	5.9	3.8	4.66	1.1
4.1	25.84	24.3	4.0	21.04	14.3	4.9	36.09	5.7	4.8	5.74	1.0
5.0	25.43	24.0	5.0	21.16	14.0	5.9	36.76	5.5	5.8	6.88	0.9
6.0	24.99	23.7	6.0	21.27	13.7	6.9	37.50	5.2	6.8	8.07	0.8
7.0	24.52	23.5	7.0	21.39	13.3	7.9	38.30	4.9	7.8	9.28	0.8
8.0	24.01	23.2	8.0	21.56	13.0	8.9	39.18	4.7	8.8	10.48	0.8
9.0	23.49	22.9	8.9	21.80	12.6	9.9	40.12	4.5	9.8	11.65	0.8
10.0	22.97	22.5	9.9	22.13	12.3	10.9	41.10	4.2	10.8	12.76	0.8
11.0	22.49	22.2	10.9	22.54	11.9	11.9	42.09	4.1	11.8	13.82	0.8
12.0	22.06	21.9	11.9	23.01	11.6	12.9	43.09	3.9	12.8	14.83	0.8
13.0	21.71	21.5	12.9	23.51	11.3	13.9	44.06	3.7	13.8	15.80	0.8
14.0	21.43	21.1	13.9	24.04	11.0	14.9	44.99	3.6	14.8	16.75	0.8
15.0	21.22	20.8	14.9	24.57	10.7	15.9	45.87	3.4	15.8	17.71	0.8
16.0	21.09	20.4	15.9	25.07	10.4	16.8	46.72	3.3	16.8	18.71	0.8
17.0	20.99	20.1	16.9	25.53	10.2	17.8	47.55	3.1	17.8	19.77	0.8
18.0	20.89	19.8	17.9	25.96	9.9	18.8	48.38	2.9	18.8	20.88	0.8
19.0	20.79	19.5	18.9	26.36	9.6	19.8	49.23	2.8	19.8	22.03	0.8
20.0	20.66	19.2	19.9	26.77	9.4	20.8	50.15	2.6	20.8	23.22	0.8
21.0	20.50	18.9	20.9	27.19	9.0	21.8	51.14	2.4	21.7	24.41	0.8
22.0	20.31	18.6	21.9	27.67	8.7	22.8	52.20	2.2	22.7	25.58	0.9
23.0	20.10	18.3	22.9	28.22	8.4	23.8	53.31	2.1	23.7	26.71	1.0
24.0	19.92	17.9	23.9	28.84	8.1	24.8	54.45	1.9	24.7	27.78	1.1
25.0	19.76	17.6	24.9	29.54	7.8	25.8	55.60	1.8	25.7	28.79	1.2
26.0	19.67	17.2	25.9	30.31	7.5	26.8	56.73	1.7	26.7	29.74	1.3
27.0	19.65	16.8	26.9	31.10	7.3	27.8	57.82	1.7	27.7	30.65	1.4
28.0	19.72	16.5	27.9	31.89	7.0	28.8	58.85	1.6	28.7	31.55	1.5
29.0	19.86	16.1	28.9	32.67	6.8	29.8	59.84	1.5	29.7	32.46	1.5
30.0	20.06	15.8	29.9	33.42	6.6	30.8	60.78	1.5	30.7	33.41	1.6
31.0	20.28	15.4	30.9	34.13	6.4	31.8	61.72	1.4	31.7	34.41	1.6
32.0	20.51	15.1	31.9	34.80	6.2	32.8	62.65	1.3	32.7	35.46	1.7

- APPARENT PLACES OF  $\lambda$  URSÆ MINORIS, FOR THE UPPER TRANSIT  
AT WASHINGTON.

Mean Solar Date.	MAY.		Mean Solar Date.	JUNE.		Mean Solar Date.	JULY.		Mean Solar Date.	AUGUST.	
	Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.
	<sup>h</sup> <sup>m</sup> 19 52	88° 55'		<sup>h</sup> <sup>m</sup> 19 53	88° 55'		<sup>h</sup> <sup>m</sup> 19 53	88° 55'		<sup>h</sup> <sup>m</sup> 19 52	88° 55'
	<sup>s</sup>	"		<sup>s</sup>	"		<sup>s</sup>	"		<sup>s</sup>	"
1.7	34.41	1.6	1.6	0.60	7.2	1.6	11.62	16.1	1.5	64.70	26.3
2.7	35.46	1.7	2.6	1.33	7.5	2.6	11.68	16.4	2.5	64.06	26.7
3.7	36.55	1.8	3.6	2.01	7.8	3.6	11.66	16.8	3.5	63.42	26.9
4.7	37.65	1.9	4.6	2.61	8.1	4.6	11.58	17.1	4.5	62.81	27.2
5.7	38.76	2.0	5.6	3.14	8.4	5.5	11.46	17.5	5.5	62.24	27.5
6.7	39.83	2.2	6.6	3.60	8.7	6.5	11.34	17.8	6.5	61.72	27.8
7.7	40.85	2.4	7.6	4.01	9.0	7.5	11.23	18.1	7.5	61.22	28.1
8.7	41.79	2.6	8.6	4.39	9.2	8.5	11.16	18.4	8.5	60.72	28.4
9.7	42.66	2.7	9.6	4.78	9.5	9.5	11.12	18.7	9.4	60.21	28.7
10.7	43.48	2.9	10.6	5.19	9.7	10.5	11.11	19.0	10.4	59.66	29.0
11.7	44.26	3.1	11.6	5.64	10.0	11.5	11.13	19.3	11.4	59.04	29.4
12.7	45.05	3.2	12.6	6.13	10.2	12.5	11.13	19.6	12.4	58.34	29.7
13.7	45.85	3.3	13.6	6.66	10.5	13.5	11.10	19.9	13.4	57.58	30.1
14.7	46.68	3.5	14.6	7.19	10.7	14.5	11.02	20.3	14.4	56.75	30.4
15.7	47.56	3.6	15.6	7.69	11.0	15.5	10.87	20.7	15.4	55.89	30.7
16.7	48.49	3.8	16.6	8.18	11.4	16.5	10.64	21.0	16.4	55.01	31.0
17.7	49.43	3.9	17.6	8.60	11.7	17.5	10.35	21.4	17.4	54.15	31.2
18.7	50.39	4.1	18.6	8.95	12.0	18.5	10.00	21.8	18.4	53.33	31.5
19.7	51.33	4.3	19.6	9.22	12.4	19.5	9.63	22.1	19.4	52.54	31.7
20.7	52.23	4.6	20.6	9.42	12.7	20.5	9.24	22.4	20.4	51.80	32.0
21.7	53.06	4.8	21.6	9.57	13.0	21.5	8.87	22.7	21.4	51.08	32.3
22.7	53.82	5.0	22.6	9.71	13.3	22.5	8.53	23.0	22.4	50.36	32.6
23.7	54.51	5.3	23.6	9.86	13.6	23.5	8.24	23.3	23.4	49.62	32.8
24.7	55.15	5.5	24.6	10.03	13.9	24.5	7.96	23.6	24.4	48.83	33.2
25.7	55.76	5.7	25.6	10.25	14.1	25.5	7.73	23.9	25.4	47.97	33.5
26.7	56.37	5.9	26.6	10.49	14.4	26.5	7.46	24.2	26.4	47.05	33.8
27.7	56.99	6.1	27.6	10.75	14.7	27.5	7.17	24.6	27.4	46.06	34.1
28.6	57.65	6.3	28.6	11.03	15.0	28.5	6.82	24.9	28.4	45.02	34.4
29.6	58.34	6.5	29.6	11.28	15.4	29.5	6.39	25.3	29.4	43.94	34.6
30.6	59.08	6.7	30.6	11.49	15.7	30.5	5.88	25.7	30.4	42.86	34.9
31.6	59.84	7.0	31.6	11.62	16.1	31.5	5.31	26.0	31.4	41.79	35.1
32.6	60.60	7.2	32.6	11.68	16.4	32.5	4.70	26.3	32.4	40.78	35.3

APPARENT PLACES OF  $\lambda$  URSÆ MINORIS, FOR THE UPPER TRANSIT.  
AT WASHINGTON.

Mean Solar Date.	SEPTEMBER.		Mean Solar Date.	OCTOBER.		Mean Solar Date.	NOVEMBER.		Mean Solar Date.	DECEMBER.	
	Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.
	<sup>h</sup> <sup>m</sup> 19 52	<sup>°</sup> <sup>'</sup> 88 55		<sup>h</sup> <sup>m</sup> 19 51	<sup>°</sup> <sup>'</sup> 88 55		<sup>h</sup> <sup>m</sup> 19 50	<sup>°</sup> <sup>'</sup> 88 55		<sup>h</sup> <sup>m</sup> 19 50	<sup>°</sup> <sup>'</sup> 88 55
1.4	40.78	35.3	1.3	65.98	41.2	1.2	84.39	43.1	1.1	46.43	40.0
2.4	39.81	35.5	2.3	64.90	41.3	2.2	83.04	43.1	2.1	45.20	39.8
3.4	38.87	35.7	3.3	63.61	41.4	3.2	81.64	43.1	3.1	43.99	39.6
4.4	37.96	36.0	4.3	62.39	41.6	4.2	80.19	43.0	4.1	42.80	39.4
5.4	37.05	36.2	5.3	61.11	41.8	5.2	78.72	43.0	5.1	41.67	39.2
6.4	36.10	36.5	6.3	59.76	41.9	6.2	77.26	43.0	6.1	40.60	38.9
7.4	35.10	36.8	7.3	58.36	42.0	7.2	75.82	42.9	7.1	39.60	38.7
8.4	34.04	37.0	8.3	56.91	42.2	8.2	74.43	42.8	8.1	38.67	38.5
9.4	32.91	37.3	9.3	55.44	42.3	9.2	73.11	42.7	9.1	37.78	38.2
10.4	31.72	37.5	10.3	53.99	42.3	10.2	71.85	42.6	10.1	36.91	38.0
11.4	30.48	37.8	11.3	52.55	42.4	11.2	70.64	42.5	11.1	36.05	37.8
12.4	29.22	38.0	12.3	51.17	42.4	12.2	69.46	42.4	12.1	35.16	37.6
13.4	27.97	38.2	13.3	49.84	42.5	13.2	68.28	42.3	13.1	34.23	37.4
14.3	26.76	38.3	14.3	48.56	42.5	14.2	67.09	42.3	14.1	33.26	37.2
15.3	25.60	38.5	15.3	47.32	42.6	15.2	65.85	42.2	15.1	32.26	37.0
16.3	24.48	38.7	16.3	46.09	42.7	16.2	64.56	42.1	16.1	31.25	36.8
17.3	23.40	38.8	17.3	44.84	42.7	17.2	63.22	42.1	17.1	30.24	36.5
18.3	22.33	39.0	18.3	43.55	42.8	18.2	61.85	42.0	18.1	29.29	36.2
19.3	21.26	39.2	19.3	42.20	42.9	19.2	60.46	41.8	19.1	28.41	35.9
20.3	20.16	39.4	20.3	40.79	43.0	20.2	59.09	41.7	20.1	27.60	35.6
21.3	19.01	39.7	21.2	39.32	43.1	21.2	57.76	41.5	21.1	26.87	35.3
22.3	17.79	39.9	22.2	37.83	43.1	22.2	56.50	41.4	22.1	26.19	35.0
23.3	16.50	40.1	23.2	36.33	43.1	23.2	55.31	41.2	23.1	25.55	34.7
24.3	15.15	40.3	24.2	34.85	43.1	24.2	54.18	41.0	24.1	24.94	34.5
25.3	13.76	40.4	25.2	33.41	43.1	25.2	53.11	40.8	25.1	24.33	34.2
26.3	12.37	40.6	26.2	32.03	43.1	26.1	52.06	40.7	26.1	23.69	34.0
27.3	11.00	40.7	27.2	30.70	43.1	27.1	51.00	40.6	27.1	23.01	33.7
28.3	9.67	40.8	28.2	29.43	43.0	28.1	49.92	40.4	28.1	22.29	33.4
29.3	8.40	40.9	29.2	28.18	43.0	29.1	48.80	40.3	29.1	21.54	33.2
30.3	7.18	41.1	30.2	26.93	43.0	30.1	47.63	40.1	30.1	20.81	32.9
31.3	5.98	41.2	31.2	25.69	43.0	31.1	46.43	40.0	31.1	20.09	32.6
32.3	4.80	41.3	32.2	24.39	43.1	32.1	45.20	39.8	32.1	19.43	32.2

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Andromedæ.			$\gamma$ Pegasi. (Algenib.)			$\beta$ Hydri.			$\alpha$ Cassiopeæ.		
	Right Ascension.	Declination North.		Right Ascension.	Declination North.		Right Ascension.	Declination South.		Right Ascension.	Declination North.	
	<sup>h</sup> 0	<sup>m</sup> 1	<sup>s</sup> 28 22	<sup>h</sup> 0	<sup>m</sup> 6	<sup>s</sup> 14 28	<sup>h</sup> 0	<sup>m</sup> 18	<sup>s</sup> 77 58	<sup>h</sup> 0	<sup>m</sup> 33	<sup>s</sup> 55 49
Jan. 1.2	45.17	-14	63.7 -0.8	37.56	-11	16.5 -0.8	58.03	-30	60.5 -0.9	14.14	-39	75.3 -0.2
11.2	45.03	.13	62.7 1.1	37.44	.11	15.6 0.9	57.15	.84	59.3 1.5	13.85	.39	74.9 0.7
21.2	44.90	.12	61.5 1.3	37.34	.10	14.7 1.0	56.34	.77	57.6 2.0	13.56	.28	73.9 1.2
31.2	44.79	.11	60.1 1.5	37.24	.09	13.7 1.0	55.61	.67	55.3 2.5	13.29	.26	72.5 1.6
Feb. 10.1	44.69	.09	58.6 1.6	37.16	.07	12.7 1.0	55.00	.56	52.6 2.9	13.05	.23	70.7 2.0
20.1	44.61	.06	56.9 1.6	37.10	.04	11.7 0.9	54.50	.42	49.5 3.3	12.84	.18	68.5 2.2
Mar. 1.1	44.58	-.02	55.3 1.6	37.07	-.01	10.8 0.8	54.15	.38	46.0 3.6	12.68	.13	66.2 2.4
11.0	44.57	+.02	53.8 1.4	37.07	+.02	10.0 0.7	53.94	-.13	42.3 3.7	12.59	-.06	63.6 2.5
21.0	44.61	.06	52.5 1.3	37.11	.06	9.4 0.4	53.88	+.02	38.5 3.8	12.56	+.01	61.1 2.5
31.0	44.70	.11	51.3 1.0	37.18	.10	9.1 -0.2	53.98	.18	34.6 3.9	12.60	.08	58.7 2.3
Apr. 10.0	44.83	.15	50.5 0.7	37.30	.14	9.1 +0.1	54.25	.34	30.8 3.8	12.72	.16	56.5 2.1
19.9	45.00	.30	50.0 -0.3	37.46	.18	9.3 0.4	54.67	.49	27.1 3.6	12.92	.33	54.6 1.8
29.9	45.22	.34	49.8 +0.1	37.67	.22	9.9 0.7	55.24	.64	23.5 3.4	13.18	.39	53.0 1.4
May 9.9	45.48	.37	50.1 0.4	37.90	.26	10.8 1.0	55.95	.78	20.2 3.1	13.51	.35	51.8 0.9
19.9	45.77	.31	50.7 0.8	38.17	.28	12.0 1.3	56.79	.90	17.2 2.8	13.89	.40	51.1 -0.5
29.8	46.09	.33	51.8 1.2	38.47	.30	13.4 1.6	57.73	.99	14.7 2.4	14.31	.44	50.9 0.0
June 8.8	46.43	.34	53.1 1.5	38.78	.32	15.1 1.8	58.77	1.07	12.5 1.9	14.77	.46	51.2 +0.5
18.8	46.77	.34	54.9 1.9	39.10	.32	17.0 2.0	59.87	1.12	10.9 1.3	15.24	.48	52.0 1.0
28.7	47.11	.34	56.9 2.1	39.43	.32	19.1 2.1	61.01	1.14	9.8 0.8	15.72	.48	53.3 1.5
July 8.7	47.45	.33	59.1 2.3	39.74	.31	21.2 2.2	62.15	1.13	9.3 -0.2	16.20	.46	55.0 1.9
18.7	47.77	.30	61.4 2.4	40.05	.29	23.4 2.2	63.27	1.09	9.4 +0.3	16.65	.44	57.1 2.3
28.7	48.06	.28	63.9 2.5	40.33	.27	25.6 2.2	64.34	1.03	10.0 0.9	17.07	.41	59.5 2.6
Aug. 7.6	48.32	.24	66.5 2.5	40.58	.23	27.7 2.1	65.33	.93	11.1 1.4	17.46	.36	62.3 2.9
17.6	48.54	.20	69.0 2.5	40.80	.20	29.8 1.9	66.19	.80	12.8 1.9	17.80	.32	65.3 3.0
27.6	48.73	.16	71.5 2.4	40.98	.16	31.6 1.8	66.92	.65	15.0 2.4	18.09	.26	68.4 3.2
Sept. 6.6	48.87	.12	73.8 2.3	41.12	.13	33.3 1.6	67.49	.46	17.5 2.6	18.33	.21	71.7 3.3
16.5	48.97	.08	76.1 2.1	41.23	.09	34.8 1.4	67.87	.29	20.3 2.9	18.51	.15	74.9 3.3
26.5	49.04	.04	78.1 2.0	41.30	.05	36.1 1.2	68.07	+.10	23.3 3.0	18.63	.09	78.2 3.2
Oct. 6.5	49.06	+.01	80.0 1.7	41.33	+.02	37.2 0.9	68.07	-.09	26.3 3.0	18.70	+.04	81.4 3.1
16.4	49.05	-.02	81.6 1.5	41.33	-.01	38.0 0.7	67.88	.28	29.3 2.9	18.71	-.02	84.4 2.9
26.4	49.01	.05	83.0 1.3	41.31	.04	38.6 0.5	67.51	.45	32.1 2.7	18.67	.07	87.2 2.7
Nov. 5.4	48.95	.08	84.1 0.9	41.26	.06	39.0 0.3	66.98	.60	34.6 2.3	18.58	.11	89.7 2.4
15.4	48.86	.10	84.8 0.6	41.19	.08	39.2 +0.1	66.32	.72	36.7 1.9	18.44	.16	91.9 2.0
25.3	48.75	.11	85.3 +0.3	41.10	.09	39.2 -0.1	65.54	.82	38.3 1.3	18.26	.20	93.8 1.6
Dec. 5.3	48.63	.13	85.5 0.0	41.00	.10	38.9 0.3	64.68	.88	39.4 0.8	18.04	.23	95.1 1.1
15.3	48.50	.13	85.3 -0.3	40.89	.11	38.4 0.5	63.77	.91	39.8 +0.1	17.80	.26	96.0 0.6
25.3	48.36	.14	84.8 0.6	40.78	.11	37.8 0.7	62.85	.91	39.7 -0.5	17.53	.27	96.4 +0.1
35.2	48.23	-.14	84.0 -0.9	40.67	-.11	37.1 -0.8	61.95	-.88	38.9 -1.1	17.25	-.29	96.3 -0.4

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\beta$ Ceti.		*21 Cassiopeæ.		$\epsilon$ Piscium.		$\theta^1$ Ceti.	
	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination South.
	<sup>h</sup> 0 37	<sup>m</sup> 18 41	<sup>h</sup> 0 37	<sup>m</sup> 74 16	<sup>h</sup> 0 56	<sup>m</sup> 7 11	<sup>h</sup> 1 17	<sup>m</sup> 8 50
Jan. 1.3	8.79 - .19	36.3 +0.5	12.47 - .79	87.5 +0.9	17.17 - .11	57.0 -0.6	36.79 - .11	49.5 +0.7
11.2	8.68 .12	36.7 +0.3	11.75 .72	87.4 -0.4	17.06 .11	56.3 0.7	36.68 .12	50.2 0.6
21.2	8.56 .11	36.9 0.0	11.03 .70	86.7 1.0	16.94 .12	55.7 0.7	36.56 .12	50.7 0.4
31.2	8.45 .10	36.8 -0.2	10.36 .65	85.5 1.5	16.82 .11	55.0 0.6	36.44 .12	51.0 +0.2
Feb. 10.2	8.35 .09	36.4 0.5	9.74 .57	83.7 2.0	16.72 .10	54.4 0.6	36.32 .11	51.1 0.0
20.1	8.27 .07	35.8 0.8	9.21 .47	81.4 2.4	16.63 .08	53.9 0.5	36.21 .10	51.0 -0.2
Mar. 1.1	8.21 .04	34.8 1.0	8.80 .35	78.8 2.7	16.55 .06	53.4 0.4	36.13 .08	50.6 0.5
11.1	8.19 - .01	33.7 1.3	8.52 .31	76.0 2.9	16.51 - .03	53.1 -0.2	36.06 .05	50.0 0.7
21.1	8.20 +0.3	32.3 1.5	8.38 - .06	73.1 2.9	16.50 +0.1	53.1 0.0	36.03 - .01	49.2 1.0
31.0	8.24 .07	30.6 1.8	8.30 +0.9	70.1 2.9	16.53 .05	53.2 +0.2	36.04 +0.2	48.1 1.2
Apr. 10.0	8.33 .11	28.7 2.0	8.56 .34	67.3 2.7	16.60 .09	53.5 0.5	36.08 .06	46.8 1.4
20.0	8.46 .15	26.6 2.1	8.88 .39	64.7 2.4	16.71 .13	54.1 0.7	36.17 .11	45.3 1.6
29.9	8.63 .19	24.4 2.3	9.33 .52	62.5 2.0	16.86 .17	55.0 1.0	36.30 .15	43.6 1.8
May 9.9	8.84 .23	22.0 2.4	9.91 .63	60.6 1.6	17.06 .21	56.1 1.2	36.47 .19	41.6 2.0
19.9	9.09 .26	19.6 2.4	10.60 .73	59.3 1.1	17.29 .25	57.5 1.5	36.68 .23	39.6 2.1
29.9	9.36 .39	17.2 2.4	11.37 .80	58.4 -0.6	17.55 .38	59.1 1.7	36.93 .26	37.4 2.2
June 8.8	9.66 .31	14.8 2.3	12.20 .85	58.1 0.0	17.84 .30	60.8 1.8	37.20 .29	35.2 2.2
18.8	9.99 .33	12.6 2.2	13.06 .87	58.4 +0.5	18.15 .31	62.7 1.9	37.50 .30	33.0 2.2
28.8	10.32 .33	10.5 2.0	13.94 .87	59.1 1.1	18.47 .32	64.7 2.0	37.81 .31	30.8 2.1
July 8.8	10.64 .32	8.6 1.8	14.81 .85	60.5 1.6	18.78 .31	66.8 2.0	38.13 .32	28.7 2.0
18.7	10.97 .31	6.9 1.5	15.64 .81	62.3 2.0	19.10 .31	68.8 2.0	38.44 .31	26.8 1.8
28.7	11.27 .29	5.6 1.2	16.42 .74	64.5 2.5	19.40 .29	70.7 1.9	38.75 .30	25.1 1.6
Aug. 7.7	11.55 .27	4.6 0.8	17.13 .67	67.2 2.8	19.67 .27	72.6 1.8	39.04 .28	23.7 1.3
17.6	11.81 .24	4.0 0.5	17.76 .58	70.2 3.1	19.93 .24	74.3 1.6	39.31 .25	22.6 1.0
27.6	12.03 .20	3.7 -0.1	18.29 .48	73.5 3.4	20.15 .21	75.8 1.4	39.54 .22	21.7 0.7
Sept. 6.6	12.21 .16	3.7 +0.2	18.72 .37	77.0 3.6	20.34 .17	77.1 1.2	39.75 .19	21.2 0.4
16.6	12.35 .12	4.1 0.5	19.04 .26	80.6 3.7	20.49 .14	78.1 1.0	39.93 .16	21.0 -0.1
26.5	12.45 .08	4.8 0.8	19.24 .14	84.4 3.7	20.61 .10	79.0 0.7	40.07 .12	21.1 +0.2
Oct. 6.5	12.52 .05	5.7 1.0	19.33 +0.3	88.1 3.7	20.70 .07	79.6 0.5	40.17 .09	21.5 0.5
16.5	12.55 +0.1	6.8 1.2	19.30 -0.9	91.7 3.5	20.75 .04	80.0 0.3	40.24 .06	22.1 0.7
26.5	12.54 - .02	8.1 1.3	19.15 .20	95.2 3.3	20.78 +0.1	80.2 +0.1	40.29 +0.3	22.9 0.8
Nov. 5.4	12.51 .04	9.4 1.3	18.89 .31	98.4 3.1	20.77 - .02	80.2 -0.1	40.30 .00	23.8 1.0
15.4	12.46 .07	10.7 1.3	18.53 .42	101.3 2.7	20.75 .04	80.1 0.2	40.28 - .03	24.8 1.0
25.4	12.38 .08	11.9 1.2	18.06 .51	103.8 2.3	20.70 .06	79.8 0.3	40.24 .05	25.8 1.0
Dec. 5.3	12.29 .10	13.1 1.1	17.51 .59	105.8 1.8	20.63 .08	79.4 0.5	40.18 .07	26.8 1.0
15.3	12.18 .11	14.1 0.9	16.89 .65	107.3 1.2	20.54 .09	78.9 0.5	40.10 .09	27.8 0.9
25.3	12.07 .12	14.8 0.7	16.21 .69	108.2 +0.6	20.44 .10	78.3 0.6	40.01 .10	28.6 0.8
35.3	11.95 - .12	15.4 +0.4	15.51 - .71	108.6 0.0	20.34 - .11	77.7 -0.6	39.90 - .11	29.4 +0.7

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	*38 Cassiopeæ.		η Piscium.		α Eridani. (Achernar.)		ο Piscium.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination North.
	<sup>h</sup> 1 <sup>m</sup> 21	<sup>°</sup> 69 <sup>'</sup> 36	<sup>h</sup> 1 <sup>m</sup> 24	<sup>°</sup> 14 <sup>'</sup> 40	<sup>h</sup> 1 <sup>m</sup> 32	<sup>°</sup> 57 <sup>'</sup> 52	<sup>h</sup> 1 <sup>m</sup> 38	<sup>°</sup> 8 <sup>'</sup> 30
Jan. 1.3	43.46 <sup>50</sup>	29.3 <sup>+0.7</sup>	37.34 <sup>-1.1</sup>	65.5 <sup>-0.4</sup>	56.45 <sup>-3.1</sup>	97.8 <sup>+0.6</sup>	37.54 <sup>-1.0</sup>	41.5 <sup>-0.5</sup>
11.2	42.95 <sup>52</sup>	29.7 <sup>+0.1</sup>	37.22 <sup>.12</sup>	65.0 <sup>0.6</sup>	56.13 <sup>.32</sup>	98.1 <sup>0.0</sup>	37.43 <sup>.12</sup>	40.9 <sup>0.6</sup>
21.2	42.42 <sup>53</sup>	29.5 <sup>-0.4</sup>	37.09 <sup>.13</sup>	64.3 <sup>0.7</sup>	55.81 <sup>.32</sup>	97.9 <sup>-0.6</sup>	37.31 <sup>.12</sup>	40.3 <sup>0.6</sup>
31.2	41.88 <sup>52</sup>	28.8 <sup>1.0</sup>	36.96 <sup>.13</sup>	63.7 <sup>0.7</sup>	55.49 <sup>.31</sup>	97.0 <sup>1.1</sup>	37.18 <sup>.13</sup>	39.8 <sup>0.6</sup>
Feb. 10.2	41.38 <sup>49</sup>	27.5 <sup>1.5</sup>	36.84 <sup>.12</sup>	62.9 <sup>0.7</sup>	55.19 <sup>.29</sup>	95.7 <sup>1.6</sup>	37.06 <sup>.12</sup>	39.2 <sup>0.5</sup>
20.1	40.92 <sup>43</sup>	25.8 <sup>2.0</sup>	36.72 <sup>.11</sup>	62.2 <sup>0.7</sup>	54.91 <sup>.26</sup>	93.8 <sup>2.1</sup>	36.93 <sup>.11</sup>	38.7 <sup>0.5</sup>
Mar. 1.1	40.52 <sup>35</sup>	23.6 <sup>2.3</sup>	36.62 <sup>.08</sup>	61.5 <sup>0.7</sup>	54.68 <sup>.22</sup>	91.4 <sup>2.5</sup>	36.83 <sup>.09</sup>	38.3 <sup>0.3</sup>
11.1	40.22 <sup>26</sup>	21.2 <sup>2.6</sup>	36.55 <sup>.05</sup>	60.8 <sup>0.6</sup>	54.48 <sup>.17</sup>	88.8 <sup>2.9</sup>	36.75 <sup>.07</sup>	38.0 <sup>0.2</sup>
21.1	40.02 <sup>.15</sup>	18.5 <sup>2.7</sup>	36.51 <sup>-.02</sup>	60.4 <sup>0.4</sup>	54.34 <sup>.11</sup>	85.7 <sup>3.2</sup>	36.70 <sup>-.03</sup>	37.8 <sup>-0.1</sup>
31.0	39.93 <sup>-.03</sup>	15.8 <sup>2.7</sup>	36.51 <sup>+0.2</sup>	60.0 <sup>-0.2</sup>	54.25 <sup>-.05</sup>	82.4 <sup>3.4</sup>	36.69 <sup>+0.1</sup>	37.9 <sup>+0.1</sup>
Apr. 10.0	39.95 <sup>+0.9</sup>	13.0 <sup>2.7</sup>	36.55 <sup>.06</sup>	59.9 <sup>0.0</sup>	54.23 <sup>+0.2</sup>	78.9 <sup>3.6</sup>	36.72 <sup>.05</sup>	38.1 <sup>0.4</sup>
20.0	40.11 <sup>.21</sup>	10.5 <sup>2.5</sup>	36.64 <sup>.11</sup>	60.0 <sup>+0.3</sup>	54.29 <sup>.09</sup>	75.3 <sup>3.6</sup>	36.78 <sup>.09</sup>	38.6 <sup>0.6</sup>
29.9	40.38 <sup>.32</sup>	8.1 <sup>2.2</sup>	36.77 <sup>.15</sup>	60.4 <sup>0.5</sup>	54.41 <sup>.16</sup>	71.7 <sup>3.6</sup>	36.90 <sup>.14</sup>	39.3 <sup>0.9</sup>
May 9.9	40.76 <sup>.43</sup>	6.1 <sup>1.8</sup>	36.94 <sup>.20</sup>	61.1 <sup>0.8</sup>	54.60 <sup>.23</sup>	68.0 <sup>3.6</sup>	37.06 <sup>.18</sup>	40.3 <sup>1.1</sup>
19.9	41.24 <sup>.52</sup>	4.5 <sup>1.4</sup>	37.16 <sup>.23</sup>	62.0 <sup>1.0</sup>	54.86 <sup>.29</sup>	64.5 <sup>3.4</sup>	37.26 <sup>.22</sup>	41.5 <sup>1.3</sup>
29.9	41.80 <sup>.60</sup>	3.3 <sup>0.9</sup>	37.41 <sup>.27</sup>	63.2 <sup>1.3</sup>	55.18 <sup>.35</sup>	61.2 <sup>3.2</sup>	37.50 <sup>.25</sup>	42.9 <sup>1.5</sup>
June 8.8	42.43 <sup>.66</sup>	2.6 <sup>-0.4</sup>	37.70 <sup>.29</sup>	64.6 <sup>1.5</sup>	55.56 <sup>.40</sup>	58.1 <sup>2.9</sup>	37.77 <sup>.28</sup>	44.5 <sup>1.7</sup>
18.8	43.11 <sup>.70</sup>	2.4 <sup>+0.1</sup>	38.00 <sup>.31</sup>	66.2 <sup>1.7</sup>	55.98 <sup>.44</sup>	55.4 <sup>2.5</sup>	38.06 <sup>.30</sup>	46.3 <sup>1.8</sup>
28.8	43.82 <sup>.72</sup>	2.7 <sup>0.6</sup>	38.32 <sup>.32</sup>	68.0 <sup>1.8</sup>	56.44 <sup>.47</sup>	53.1 <sup>2.1</sup>	38.37 <sup>.31</sup>	48.2 <sup>1.9</sup>
July 8.8	44.54 <sup>.72</sup>	3.6 <sup>1.1</sup>	38.64 <sup>.32</sup>	69.9 <sup>1.9</sup>	56.92 <sup>.49</sup>	51.3 <sup>1.6</sup>	38.69 <sup>.32</sup>	50.1 <sup>1.9</sup>
18.7	45.26 <sup>.70</sup>	4.9 <sup>1.6</sup>	38.96 <sup>.32</sup>	71.8 <sup>2.0</sup>	57.41 <sup>.49</sup>	49.9 <sup>1.0</sup>	39.00 <sup>.31</sup>	52.0 <sup>1.9</sup>
28.7	45.95 <sup>.67</sup>	6.7 <sup>2.0</sup>	39.28 <sup>.30</sup>	73.8 <sup>1.9</sup>	57.90 <sup>.48</sup>	49.2 <sup>-0.5</sup>	39.31 <sup>.30</sup>	53.9 <sup>1.9</sup>
Aug. 7.7	46.60 <sup>.63</sup>	8.9 <sup>2.4</sup>	39.57 <sup>.29</sup>	75.7 <sup>1.9</sup>	58.37 <sup>.46</sup>	48.9 <sup>+0.1</sup>	39.61 <sup>.29</sup>	55.7 <sup>1.7</sup>
17.6	47.21 <sup>.57</sup>	11.4 <sup>2.7</sup>	39.85 <sup>.26</sup>	77.6 <sup>1.8</sup>	58.81 <sup>.42</sup>	49.3 <sup>0.6</sup>	39.89 <sup>.26</sup>	57.4 <sup>1.6</sup>
27.6	47.75 <sup>.51</sup>	14.3 <sup>3.0</sup>	40.09 <sup>.23</sup>	79.4 <sup>1.7</sup>	59.22 <sup>.38</sup>	50.2 <sup>1.2</sup>	40.14 <sup>.24</sup>	58.9 <sup>1.4</sup>
Sept. 6.6	48.22 <sup>.43</sup>	17.4 <sup>3.2</sup>	40.31 <sup>.20</sup>	81.0 <sup>1.5</sup>	59.57 <sup>.32</sup>	51.7 <sup>1.7</sup>	40.36 <sup>.21</sup>	60.2 <sup>1.2</sup>
16.6	48.62 <sup>.35</sup>	20.8 <sup>3.4</sup>	40.49 <sup>.17</sup>	82.4 <sup>1.3</sup>	59.86 <sup>.26</sup>	53.6 <sup>2.1</sup>	40.56 <sup>.18</sup>	61.3 <sup>1.0</sup>
26.5	48.93 <sup>.27</sup>	24.2 <sup>3.5</sup>	40.64 <sup>.13</sup>	83.6 <sup>1.1</sup>	60.09 <sup>.19</sup>	55.9 <sup>2.4</sup>	40.72 <sup>.15</sup>	62.2 <sup>0.8</sup>
Oct. 6.5	49.15 <sup>.18</sup>	27.7 <sup>3.5</sup>	40.76 <sup>.10</sup>	84.7 <sup>0.9</sup>	60.25 <sup>.12</sup>	58.5 <sup>2.7</sup>	40.85 <sup>.11</sup>	62.9 <sup>0.5</sup>
16.5	49.29 <sup>+0.9</sup>	31.2 <sup>3.5</sup>	40.85 <sup>.07</sup>	85.5 <sup>0.7</sup>	60.33 <sup>+0.5</sup>	61.3 <sup>2.9</sup>	40.95 <sup>.08</sup>	63.3 <sup>0.3</sup>
26.5	49.33 <sup>.00</sup>	34.7 <sup>3.3</sup>	40.90 <sup>.04</sup>	86.1 <sup>0.5</sup>	60.35 <sup>-.02</sup>	64.2 <sup>2.9</sup>	41.02 <sup>.05</sup>	63.5 <sup>+0.2</sup>
Nov. 5.4	49.28 <sup>-.09</sup>	37.9 <sup>3.1</sup>	40.93 <sup>+0.1</sup>	86.6 <sup>0.4</sup>	60.30 <sup>.08</sup>	67.0 <sup>2.8</sup>	41.05 <sup>+0.2</sup>	63.6 <sup>0.0</sup>
15.4	49.15 <sup>.18</sup>	41.0 <sup>2.9</sup>	40.92 <sup>-.01</sup>	86.8 <sup>+0.2</sup>	60.19 <sup>.14</sup>	69.7 <sup>2.6</sup>	41.07 <sup>.00</sup>	63.5 <sup>-0.2</sup>
25.4	48.92 <sup>.26</sup>	43.7 <sup>2.5</sup>	40.90 <sup>.04</sup>	86.9 <sup>0.0</sup>	60.02 <sup>.19</sup>	72.2 <sup>2.3</sup>	41.05 <sup>-.03</sup>	63.3 <sup>0.3</sup>
Dec. 5.3	48.62 <sup>.34</sup>	46.0 <sup>2.1</sup>	40.85 <sup>.06</sup>	86.9 <sup>-0.1</sup>	59.80 <sup>.24</sup>	74.3 <sup>1.9</sup>	41.01 <sup>.05</sup>	63.0 <sup>0.4</sup>
15.3	48.24 <sup>.41</sup>	47.8 <sup>1.5</sup>	40.77 <sup>.08</sup>	86.7 <sup>0.3</sup>	59.54 <sup>.27</sup>	75.9 <sup>1.4</sup>	40.95 <sup>.07</sup>	62.5 <sup>0.5</sup>
25.3	47.80 <sup>.46</sup>	49.2 <sup>1.1</sup>	40.68 <sup>.10</sup>	86.3 <sup>0.4</sup>	59.25 <sup>.30</sup>	77.1 <sup>0.9</sup>	40.87 <sup>.09</sup>	62.0 <sup>0.5</sup>
35.3	47.32 <sup>-50</sup>	50.0 <sup>+0.5</sup>	40.57 <sup>-1.1</sup>	85.9 <sup>-0.5</sup>	58.94 <sup>-.32</sup>	77.7 <sup>+0.4</sup>	40.77 <sup>-1.1</sup>	61.5 <sup>-0.6</sup>

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\beta$ Arietis.		*50 Cassiopeiæ.		$\alpha$ Arietis.		$\zeta^1$ Ceti.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	<sup>h</sup> 1 47 <sup>m</sup>	<sup>°</sup> 20 10 <sup>'</sup>	<sup>h</sup> 1 52 <sup>m</sup>	<sup>°</sup> 71 47 <sup>'</sup>	<sup>h</sup> 1 59 <sup>m</sup>	<sup>°</sup> 22 51 <sup>'</sup>	<sup>h</sup> 2 6 <sup>m</sup>	<sup>°</sup> 8 14 <sup>'</sup>
Jan. 1.3	33.66 <sup>s</sup> -11	53.6 <sup>s</sup> -0.3	32.46 <sup>s</sup> -53	72.4 <sup>s</sup> +1.2	57.07 <sup>s</sup> -10	23.2 <sup>s</sup> -0.2	12.46 <sup>s</sup> -0.9	38.7 <sup>s</sup> -0.5
11.3	33.54 <sup>s</sup> .13	53.2 <sup>s</sup> 0.4	31.91 <sup>s</sup> .58	73.3 <sup>s</sup> +0.6	56.95 <sup>s</sup> .13	22.9 <sup>s</sup> 0.4	12.36 <sup>s</sup> .11	38.2 <sup>s</sup> 0.5
21.2	33.40 <sup>s</sup> .14	52.7 <sup>s</sup> 0.6	31.31 <sup>s</sup> .60	73.6 <sup>s</sup> 0.0	56.82 <sup>s</sup> .14	22.5 <sup>s</sup> 0.5	12.23 <sup>s</sup> .13	37.6 <sup>s</sup> 0.5
31.2	33.26 <sup>s</sup> .14	52.0 <sup>s</sup> 0.7	30.70 <sup>s</sup> .61	73.3 <sup>s</sup> -0.6	56.67 <sup>s</sup> .15	21.9 <sup>s</sup> 0.7	12.10 <sup>s</sup> .13	37.1 <sup>s</sup> 0.5
Feb. 10.2	33.12 <sup>s</sup> .14	51.3 <sup>s</sup> 0.8	30.10 <sup>s</sup> .58	72.5 <sup>s</sup> 1.1	56.52 <sup>s</sup> .15	21.2 <sup>s</sup> 0.8	11.97 <sup>s</sup> .13	36.6 <sup>s</sup> 0.5
20.2	32.99 <sup>s</sup> .13	50.5 <sup>s</sup> 0.8	29.53 <sup>s</sup> .53	71.1 <sup>s</sup> 1.6	56.37 <sup>s</sup> .14	20.3 <sup>s</sup> 0.9	11.83 <sup>s</sup> .13	36.1 <sup>s</sup> 0.4
Mar. 1.1	32.87 <sup>s</sup> .11	49.6 <sup>s</sup> 0.8	29.03 <sup>s</sup> .46	69.3 <sup>s</sup> 2.0	56.25 <sup>s</sup> .12	19.5 <sup>s</sup> 0.9	11.71 <sup>s</sup> .11	35.8 <sup>s</sup> 0.3
11.1	32.77 <sup>s</sup> .08	48.8 <sup>s</sup> 0.8	28.61 <sup>s</sup> .37	67.0 <sup>s</sup> 2.4	56.14 <sup>s</sup> .09	18.6 <sup>s</sup> 0.9	11.61 <sup>s</sup> .09	35.5 <sup>s</sup> -0.2
21.1	32.71 <sup>s</sup> -0.04	48.1 <sup>s</sup> 0.7	28.30 <sup>s</sup> .26	64.5 <sup>s</sup> 2.6	56.06 <sup>s</sup> .06	17.7 <sup>s</sup> 0.8	11.53 <sup>s</sup> .06	35.4 <sup>s</sup> 0.0
31.1	32.68 <sup>s</sup> .00	47.5 <sup>s</sup> 0.5	28.10 <sup>s</sup> -1.3	61.9 <sup>s</sup> 2.7	56.02 <sup>s</sup> -0.1	17.0 <sup>s</sup> 0.7	11.49 <sup>s</sup> -0.2	35.5 <sup>s</sup> +0.1
Apr. 10.0	32.70 <sup>s</sup> +0.04	47.0 <sup>s</sup> 0.3	28.04 <sup>s</sup> +0.1	59.1 <sup>s</sup> 2.7	56.03 <sup>s</sup> +0.3	16.4 <sup>s</sup> 0.5	11.49 <sup>s</sup> +0.2	35.7 <sup>s</sup> 0.4
20.0	32.77 <sup>s</sup> .09	46.8 <sup>s</sup> -0.1	28.12 <sup>s</sup> .14	56.5 <sup>s</sup> 2.6	56.08 <sup>s</sup> .08	16.0 <sup>s</sup> -0.3	11.54 <sup>s</sup> .07	36.2 <sup>s</sup> 0.6
30.0	32.88 <sup>s</sup> .14	46.8 <sup>s</sup> +0.1	28.32 <sup>s</sup> .27	53.9 <sup>s</sup> 2.4	56.18 <sup>s</sup> .13	15.8 <sup>s</sup> 0.0	11.63 <sup>s</sup> .11	36.9 <sup>s</sup> 0.8
May 9.9	33.04 <sup>s</sup> .18	47.1 <sup>s</sup> 0.4	28.66 <sup>s</sup> .40	51.7 <sup>s</sup> 2.1	56.33 <sup>s</sup> .17	15.9 <sup>s</sup> +0.2	11.76 <sup>s</sup> .16	37.8 <sup>s</sup> 1.0
19.9	33.24 <sup>s</sup> .22	47.6 <sup>s</sup> 0.7	29.12 <sup>s</sup> .51	49.7 <sup>s</sup> 1.7	56.53 <sup>s</sup> .22	16.3 <sup>s</sup> 0.5	11.94 <sup>s</sup> .20	39.0 <sup>s</sup> 1.3
29.9	33.49 <sup>s</sup> .26	48.4 <sup>s</sup> 1.0	29.68 <sup>s</sup> .60	48.2 <sup>s</sup> 1.3	56.77 <sup>s</sup> .25	16.9 <sup>s</sup> 0.8	12.15 <sup>s</sup> .23	40.3 <sup>s</sup> 1.4
June 8.9	33.76 <sup>s</sup> .29	49.5 <sup>s</sup> 1.2	30.33 <sup>s</sup> .68	47.1 <sup>s</sup> 0.9	57.04 <sup>s</sup> .29	17.8 <sup>s</sup> 1.0	12.40 <sup>s</sup> .27	41.9 <sup>s</sup> 1.6
18.8	34.07 <sup>s</sup> .31	50.9 <sup>s</sup> 1.4	31.05 <sup>s</sup> .74	46.5 <sup>s</sup> -0.4	57.34 <sup>s</sup> .31	19.0 <sup>s</sup> 1.3	12.68 <sup>s</sup> .29	43.6 <sup>s</sup> 1.7
28.8	34.39 <sup>s</sup> .32	52.4 <sup>s</sup> 1.6	31.81 <sup>s</sup> .78	46.3 <sup>s</sup> +0.1	57.66 <sup>s</sup> .33	20.3 <sup>s</sup> 1.5	12.98 <sup>s</sup> .30	45.3 <sup>s</sup> 1.8
July 8.8	34.72 <sup>s</sup> .33	54.1 <sup>s</sup> 1.7	32.61 <sup>s</sup> .80	46.7 <sup>s</sup> 0.6	58.00 <sup>s</sup> .33	21.9 <sup>s</sup> 1.6	13.29 <sup>s</sup> .31	47.2 <sup>s</sup> 1.9
18.8	35.05 <sup>s</sup> .33	55.9 <sup>s</sup> 1.8	33.41 <sup>s</sup> .80	47.6 <sup>s</sup> 1.1	58.33 <sup>s</sup> .33	23.6 <sup>s</sup> 1.8	13.61 <sup>s</sup> .31	49.1 <sup>s</sup> 1.8
28.7	35.37 <sup>s</sup> .32	57.8 <sup>s</sup> 1.9	34.20 <sup>s</sup> .78	48.9 <sup>s</sup> 1.6	58.66 <sup>s</sup> .32	25.4 <sup>s</sup> 1.8	13.92 <sup>s</sup> .31	50.9 <sup>s</sup> 1.8
Aug. 7.7	35.68 <sup>s</sup> .30	59.7 <sup>s</sup> 1.9	34.97 <sup>s</sup> .75	50.7 <sup>s</sup> 2.0	58.98 <sup>s</sup> .31	27.3 <sup>s</sup> 1.9	14.23 <sup>s</sup> .30	52.6 <sup>s</sup> 1.7
17.7	35.97 <sup>s</sup> .28	61.6 <sup>s</sup> 1.9	35.70 <sup>s</sup> .70	52.9 <sup>s</sup> 2.4	59.29 <sup>s</sup> .29	29.2 <sup>s</sup> 1.9	14.52 <sup>s</sup> .28	54.2 <sup>s</sup> 1.5
27.6	36.24 <sup>s</sup> .25	63.4 <sup>s</sup> 1.8	36.36 <sup>s</sup> .63	55.5 <sup>s</sup> 2.7	59.57 <sup>s</sup> .27	31.0 <sup>s</sup> 1.8	14.78 <sup>s</sup> .26	55.7 <sup>s</sup> 1.3
Sept. 6.6	36.48 <sup>s</sup> .22	65.2 <sup>s</sup> 1.7	36.97 <sup>s</sup> .57	58.3 <sup>s</sup> 3.0	59.82 <sup>s</sup> .24	32.8 <sup>s</sup> 1.7	15.03 <sup>s</sup> .23	56.9 <sup>s</sup> 1.1
16.6	36.69 <sup>s</sup> .19	66.8 <sup>s</sup> 1.5	37.49 <sup>s</sup> .48	61.4 <sup>s</sup> 3.2	60.04 <sup>s</sup> .21	34.5 <sup>s</sup> 1.6	15.24 <sup>s</sup> .20	58.0 <sup>s</sup> 0.9
26.6	36.87 <sup>s</sup> .16	68.3 <sup>s</sup> 1.4	37.93 <sup>s</sup> .39	64.7 <sup>s</sup> 3.4	60.23 <sup>s</sup> .18	36.0 <sup>s</sup> 1.5	15.43 <sup>s</sup> .17	58.8 <sup>s</sup> 0.7
Oct. 6.5	37.01 <sup>s</sup> .13	69.6 <sup>s</sup> 1.2	38.28 <sup>s</sup> .30	68.1 <sup>s</sup> 3.5	60.39 <sup>s</sup> .14	37.5 <sup>s</sup> 1.3	15.59 <sup>s</sup> .14	59.4 <sup>s</sup> 0.5
16.5	37.13 <sup>s</sup> .10	70.7 <sup>s</sup> 1.0	38.53 <sup>s</sup> .20	71.6 <sup>s</sup> 3.5	60.52 <sup>s</sup> .11	38.7 <sup>s</sup> 1.2	15.71 <sup>s</sup> .11	59.8 <sup>s</sup> 0.3
26.5	37.21 <sup>s</sup> .07	71.6 <sup>s</sup> 0.9	38.68 <sup>s</sup> +1.0	75.1 <sup>s</sup> 3.4	60.62 <sup>s</sup> .08	39.8 <sup>s</sup> 1.0	15.81 <sup>s</sup> .08	59.9 <sup>s</sup> +0.1
Nov. 5.5	37.26 <sup>s</sup> .04	72.4 <sup>s</sup> 0.7	38.73 <sup>s</sup> -0.1	78.5 <sup>s</sup> 3.3	60.69 <sup>s</sup> .05	40.7 <sup>s</sup> 0.8	15.88 <sup>s</sup> .05	60.0 <sup>s</sup> -0.1
15.4	37.28 <sup>s</sup> +0.1	73.0 <sup>s</sup> 0.5	38.67 <sup>s</sup> .11	81.7 <sup>s</sup> 3.1	60.72 <sup>s</sup> +0.2	41.5 <sup>s</sup> 0.7	15.91 <sup>s</sup> +0.2	59.8 <sup>s</sup> 0.2
25.4	37.27 <sup>s</sup> -0.2	73.4 <sup>s</sup> 0.3	38.51 <sup>s</sup> .21	84.7 <sup>s</sup> 2.8	60.72 <sup>s</sup> -0.1	42.0 <sup>s</sup> 0.5	15.92 <sup>s</sup> -0.1	59.6 <sup>s</sup> 0.3
Dec. 5.4	37.24 <sup>s</sup> .05	73.6 <sup>s</sup> +0.1	38.24 <sup>s</sup> .31	87.3 <sup>s</sup> 2.4	60.70 <sup>s</sup> .04	42.4 <sup>s</sup> 0.3	15.90 <sup>s</sup> .03	59.2 <sup>s</sup> 0.4
15.3	37.18 <sup>s</sup> .07	73.7 <sup>s</sup> 0.0	37.88 <sup>s</sup> .40	89.6 <sup>s</sup> 2.0	60.64 <sup>s</sup> .07	42.6 <sup>s</sup> +0.1	15.86 <sup>s</sup> .06	58.8 <sup>s</sup> 0.5
25.3	37.09 <sup>s</sup> .10	73.6 <sup>s</sup> -0.2	37.44 <sup>s</sup> .48	91.3 <sup>s</sup> 1.5	60.56 <sup>s</sup> .09	42.7 <sup>s</sup> -0.1	15.76 <sup>s</sup> .08	58.3 <sup>s</sup> 0.5
35.3	36.98 <sup>s</sup> -1.2	73.3 <sup>s</sup> -0.3	36.92 <sup>s</sup> -5.5	92.6 <sup>s</sup> +1.0	60.46 <sup>s</sup> -1.1	42.5 <sup>s</sup> -0.3	15.70 <sup>s</sup> -1.0	57.8 <sup>s</sup> -0.5

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	* $\gamma$ Cassiopeæ.		$\gamma$ Ceti.		$\alpha$ Ceti.		*48 Cephei.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	<sup>h</sup> 2 <sup>m</sup> 18	<sup>°</sup> 66 <sup>'</sup> 49	<sup>h</sup> 2 <sup>m</sup> 36	<sup>°</sup> 2 <sup>'</sup> 41	<sup>h</sup> 2 <sup>m</sup> 55	<sup>°</sup> 3 <sup>'</sup> 35	<sup>h</sup> 3 <sup>m</sup> 4	<sup>°</sup> 77 <sup>'</sup> 15
Jan. 1.3	32.55 - .37	40.5 +1.3	39.83 - .08	37.5 -0.7	35.13 - .07	5.4 -0.7	10.93 - .60	48.7 +2.1
11.3	32.16 .41	41.5 0.8	39.74 .11	36.8 0.6	35.04 .10	4.8 0.6	10.27 .72	50.6 1.6
21.3	31.73 .45	42.1 +0.3	39.62 .13	36.2 0.5	34.93 .12	4.2 0.5	9.49 .81	51.9 1.1
31.3	31.26 .47	42.0 -0.3	39.49 .14	35.7 0.4	34.80 .14	3.7 0.5	8.64 .88	52.7 +0.5
Feb. 10.2	30.79 .46	41.5 0.8	39.35 .14	35.3 0.3	34.66 .15	3.3 0.4	7.74 .90	52.9 -0.1
20.2	30.34 .44	40.4 1.3	39.20 .14	35.0 0.2	34.51 .15	3.0 0.2	6.84 .88	52.5 0.7
Mar. 1.2	29.92 .39	38.9 1.7	39.06 .13	34.8 -0.1	34.36 .14	2.8 -0.1	5.97 .83	51.6 1.2
11.2	29.56 .39	37.0 2.1	38.94 .11	34.8 +0.1	34.23 .12	2.8 0.0	5.18 .74	50.1 1.7
21.1	29.28 .34	34.7 2.3	38.85 .08	35.0 0.2	34.12 .10	2.9 +0.2	4.49 .62	48.2 2.1
31.1	29.08 .15	32.3 2.5	38.78 .06	35.3 0.4	34.03 .06	3.2 0.4	3.96 .47	45.9 2.4
Apr. 10.1	28.99 - .04	29.8 2.5	38.75 - .01	35.9 0.7	33.99 - .03	3.7 0.6	3.56 .29	43.4 2.6
20.0	29.00 + .07	27.3 2.5	38.76 + .04	36.7 0.9	33.98 + .02	4.3 0.8	3.36 - .11	40.7 2.7
30.0	29.12 .18	24.9 2.3	38.82 .08	37.6 1.1	34.02 .06	5.2 1.0	3.34 + .08	37.9 2.7
May 10.0	29.35 .28	22.7 2.1	38.92 .12	38.8 1.3	34.10 .11	6.3 1.2	3.52 .27	35.2 2.6
20.0	29.68 .38	20.8 1.8	39.07 .17	40.2 1.5	34.23 .15	7.6 1.4	3.87 .44	32.7 2.4
29.9	30.10 .46	19.2 1.4	39.25 .21	41.8 1.6	34.41 .19	9.1 1.5	4.41 .61	30.4 2.1
June 8.9	30.61 .53	18.0 1.0	39.48 .24	43.5 1.8	34.62 .23	10.7 1.7	5.09 .76	28.4 1.8
18.9	31.17 .59	17.2 0.5	39.74 .27	45.3 1.8	34.86 .26	12.5 1.8	5.92 .88	26.8 1.4
28.9	31.78 .63	16.9 -0.1	40.02 .29	47.2 1.9	35.13 .28	14.3 1.8	6.86 .98	25.7 0.9
July 8.8	32.43 .65	17.1 +0.4	40.31 .30	49.0 1.9	35.43 .30	16.1 1.8	7.89 1.06	24.9 -0.5
18.8	33.09 .66	17.7 0.9	40.62 .31	50.9 1.8	35.73 .30	17.9 1.8	8.98 1.11	24.7 0.0
28.8	33.76 .66	18.8 1.3	40.93 .31	52.7 1.7	36.04 .31	19.6 1.7	10.11 1.13	24.9 +0.4
Aug. 7.7	34.41 .64	20.3 1.7	41.24 .30	54.3 1.5	36.35 .30	21.2 1.5	11.25 1.14	25.6 0.9
17.7	35.03 .61	22.2 2.1	41.53 .29	55.8 1.3	36.64 .29	22.7 1.3	12.38 1.12	26.7 1.4
27.7	35.62 .57	24.4 2.4	41.81 .27	57.0 1.1	36.93 .28	23.9 1.1	13.48 1.07	28.3 1.8
Sept. 6.7	36.16 .51	27.0 2.7	42.07 .25	58.0 0.9	37.20 .28	24.9 0.9	14.53 1.02	30.3 2.2
16.6	36.65 .46	29.8 2.9	42.31 .22	58.8 0.6	37.45 .24	25.7 0.6	15.52 .93	32.7 2.5
26.6	37.08 .39	32.8 3.1	42.52 .20	59.3 0.4	37.67 .21	26.2 0.4	16.41 .84	35.3 2.8
Oct. 6.6	37.43 .32	35.9 3.2	42.70 .17	59.5 +0.1	37.87 .19	26.5 +0.1	17.20 .73	38.3 3.1
16.6	37.72 .24	39.1 3.2	42.85 .14	59.5 -0.1	38.04 .16	26.5 -0.1	17.87 .60	41.5 3.3
26.5	37.92 .17	42.4 3.2	42.98 .11	59.3 0.3	38.19 .13	26.3 0.3	18.41 .46	44.8 3.4
Nov. 5.5	38.05 + .08	45.6 3.1	43.07 .08	58.9 0.5	38.30 .10	25.9 0.4	18.80 .31	48.2 3.4
15.5	38.09 .00	48.7 3.0	43.14 .05	58.4 0.6	38.39 .07	25.4 0.5	19.03 + .15	51.6 3.4
25.4	38.05 - .09	51.6 2.7	43.17 + .02	57.8 0.6	38.44 .04	24.8 0.6	19.11 - .01	55.0 3.3
Dec. 5.4	37.92 .17	54.2 2.4	43.18 - .01	57.1 0.7	38.46 + .01	24.2 0.7	19.01 .18	58.2 3.1
15.4	37.71 .25	56.4 2.1	43.15 .04	56.4 0.7	38.45 - .02	23.5 0.7	18.75 .35	61.1 2.8
25.4	37.43 .32	58.3 1.6	43.10 .06	55.7 0.7	38.41 .05	22.8 0.7	18.32 .50	63.7 2.4
35.3	37.08 - .38	59.7 +1.1	43.02 - .09	55.0 -0.6	38.35 - .08	22.1 -0.6	17.75 - .63	65.9 +1.9



## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ζ Arietis.		α Persei.		δ Persei.		γ Tauri.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	<sup>h</sup> 3 <sup>m</sup> 7	<sup>°</sup> 20 <sup>'</sup> 34	<sup>h</sup> 3 <sup>m</sup> 15	<sup>°</sup> 49 <sup>'</sup> 24	<sup>h</sup> 3 <sup>m</sup> 33	<sup>°</sup> 47 <sup>'</sup> 22	<sup>h</sup> 3 <sup>m</sup> 39	<sup>°</sup> 23 <sup>'</sup> 42
Jan. 1.3	32.56 -.07	7.8 0.0	11.49 -.13	19.0 +1.3	49.01 -.10	39.2 +1.3	52.57 -.05	23.1 +0.2
11.3	32.48 .10	7.8 -0.1	11.34 .17	20.1 0.9	48.88 .15	40.3 0.9	52.51 .09	23.2 +0.1
21.3	32.36 .13	7.6 0.2	11.15 .31	20.8 0.5	48.71 .19	41.1 0.6	52.40 .12	23.2 0.0
31.3	32.22 .15	7.3 0.3	10.92 .34	21.1 +0.1	48.51 .22	41.5 +0.3	52.27 .15	23.1 -0.2
Feb. 10.2	32.07 .16	6.9 0.4	10.67 .36	21.0 -0.3	48.27 .34	41.6 -0.1	52.11 .16	27.9 0.3
20.2	31.90 .16	6.4 0.5	10.41 .36	20.5 0.6	48.03 .35	41.3 0.4	51.94 .17	27.6 0.3
Mar. 1.2	31.74 .15	5.9 0.5	10.16 .35	19.7 1.0	47.78 .34	40.7 0.3	51.77 .17	27.2 0.4
11.2	31.59 .14	5.4 0.5	9.92 .32	18.6 1.2	47.54 .33	39.8 1.0	51.60 .16	26.7 0.5
21.1	31.47 .11	4.8 0.5	9.71 .18	17.3 1.5	47.32 .19	38.6 1.3	51.45 .14	26.2 0.5
31.1	31.37 .08	4.3 0.4	9.55 .13	15.7 1.6	47.15 .15	37.2 1.4	51.33 .11	25.7 0.5
Apr. 10.1	31.31 -.04	3.9 0.3	9.44 .07	14.0 1.7	47.03 .09	35.8 1.5	51.24 .07	25.2 0.5
20.0	31.30 +.01	3.7 -0.2	9.39 -.01	12.3 1.7	46.96 -.03	34.2 1.6	51.19 -.02	24.7 0.4
30.0	31.33 .06	3.6 0.0	9.41 +.06	10.6 1.6	46.96 +.03	32.6 1.5	51.19 +.03	24.4 0.2
May 10.0	31.41 .11	3.6 +0.2	9.50 .12	9.1 1.5	47.03 .10	31.1 1.4	51.25 .08	24.3 -0.1
20.0	31.54 .15	3.9 0.4	9.66 .19	7.7 1.3	47.16 .16	29.8 1.2	51.35 .13	24.3 +0.1
29.9	31.72 .30	4.4 0.6	9.88 .25	6.5 1.6	47.35 .22	28.7 1.6	51.50 .17	24.5 0.3
June 8.9	31.94 .34	5.1 0.8	10.16 .31	5.6 0.7	47.60 .28	27.8 0.8	51.69 .21	24.9 0.5
18.9	32.19 .27	6.0 1.0	10.50 .35	5.1 0.4	47.91 .32	27.2 0.5	51.93 .25	25.4 0.7
28.9	32.48 .20	7.1 1.2	10.87 .30	4.8 -0.1	48.25 .36	26.8 -0.2	52.20 .28	26.2 0.8
July 8.8	32.78 .31	8.3 1.3	11.27 .22	4.9 +0.3	48.63 .30	26.8 +0.1	52.49 .30	27.1 1.0
18.8	33.10 .32	9.6 1.4	11.70 .23	5.3 0.6	49.04 .21	27.1 0.4	52.81 .32	28.1 1.1
28.8	33.43 .33	11.1 1.5	12.14 .24	6.0 0.9	49.46 .22	27.7 0.7	53.13 .33	29.3 1.2
Aug. 7.7	33.76 .32	12.5 1.5	12.58 .24	7.1 1.2	49.89 .23	28.5 1.0	53.46 .33	30.5 1.2
17.7	34.08 .31	14.0 1.5	13.02 .23	8.4 1.4	50.31 .22	29.6 1.2	53.79 .33	31.8 1.3
27.7	34.39 .30	15.5 1.4	13.44 .21	9.9 1.6	50.73 .21	30.9 1.4	54.12 .32	33.0 1.2
Sept. 6.7	34.68 .28	16.8 1.3	13.85 .20	11.6 1.8	51.14 .20	32.4 1.6	54.43 .30	34.3 1.2
16.6	34.95 .26	18.1 1.2	14.23 .20	13.6 2.0	51.52 .27	34.1 1.8	54.73 .29	35.5 1.1
26.6	35.20 .24	19.3 1.1	14.58 .23	15.6 2.1	51.88 .34	36.0 1.9	55.00 .27	36.5 1.0
Oct. 6.6	35.42 .21	20.3 1.0	14.90 .20	17.8 2.2	52.21 .31	37.9 2.0	55.26 .25	37.5 1.0
16.6	35.62 .18	21.3 0.8	15.18 .20	20.0 2.2	52.50 .28	39.9 2.0	55.50 .22	38.5 0.9
26.5	35.79 .15	22.0 0.7	15.42 .22	22.3 2.3	52.76 .24	41.9 2.1	55.70 .19	39.3 0.8
Nov. 5.5	35.93 .12	22.7 0.6	15.61 .17	24.5 2.2	52.98 .19	44.0 2.0	55.87 .16	40.0 0.7
15.5	36.04 .09	23.2 0.5	15.76 .12	26.7 2.1	53.15 .15	46.0 2.0	56.02 .13	40.6 0.6
25.4	36.11 .06	23.6 0.4	15.86 .07	28.8 2.0	53.28 .10	48.0 1.9	56.14 .09	41.2 0.5
Dec. 5.4	36.15 +.02	23.9 0.2	15.90 +.02	30.8 1.9	53.35 +.05	49.8 1.8	56.21 .06	41.6 0.4
15.4	36.16 -.01	24.1 +0.1	15.89 -.04	32.6 1.6	53.37 -.01	51.5 1.6	56.25 +.02	42.0 0.3
25.4	36.12 .05	24.1 0.0	15.83 .09	34.1 1.4	53.34 .06	53.1 1.4	56.24 -.02	42.2 0.2
35.3	36.06 -.08	24.1 -0.1	15.71 -.14	35.3 +1.1	53.25 -.11	54.3 +1.1	56.20 -.06	42.4 +0.1

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\zeta$ Persei.		$\gamma^1$ Eridani.		$\gamma$ Tauri.		$\epsilon$ Tauri.	
	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	<sup>h</sup> 3 <sup>m</sup> 46	<sup>°</sup> 31 <sup>'</sup> 30	<sup>h</sup> 3 <sup>m</sup> 52	<sup>°</sup> 13 <sup>'</sup> 52	<sup>h</sup> 4 <sup>m</sup> 12	<sup>°</sup> 15 <sup>'</sup> 18	<sup>h</sup> 4 <sup>m</sup> 21	<sup>°</sup> 18 <sup>'</sup> 53
Jan. 1.4	5.29 -05	8.0 +0.6	3.61 -05	33.6 +1.4	30.66 -02	59.7 -0.2	8.68 -01	41.1 0.0
11.3	5.22 .09	8.5 0.4	3.54 .09	34.9 1.2	30.62 .06	59.5 0.2	8.64 .05	41.1 0.0
21.3	5.11 .13	8.8 +0.2	3.44 .12	36.0 1.0	30.54 .10	59.3 0.2	8.57 .09	41.0 -0.1
31.3	4.97 .16	9.0 0.0	3.30 .14	36.9 0.7	30.43 .13	59.0 0.2	8.46 .12	40.9 0.1
Feb. 10.3	4.79 .18	8.9 -0.2	3.15 .16	37.4 0.4	30.29 .15	58.8 0.2	8.32 .15	40.8 0.2
20.2	4.61 .19	8.6 0.3	2.98 .17	37.7 +0.1	30.13 .16	58.6 0.2	8.16 .17	40.6 0.2
Mar. 1.2	4.42 .19	8.2 0.5	2.81 .17	37.6 -0.2	29.96 .17	58.4 0.2	7.99 .17	40.4 0.2
11.2	4.23 .17	7.6 0.6	2.64 .16	37.3 0.5	29.79 .16	58.1 0.2	7.81 .17	40.2 0.2
21.2	4.07 .15	7.0 0.7	2.48 .15	36.7 0.8	29.63 .15	58.0 0.2	7.65 .15	39.9 0.2
31.1	3.93 .12	6.2 0.8	2.34 .12	35.8 1.1	29.50 .12	57.8 -0.1	7.51 .13	39.7 0.2
Apr. 10.1	3.83 .08	5.4 0.8	2.24 .09	34.6 1.3	29.39 .09	57.8 0.0	7.39 .10	39.5 0.2
20.1	3.77 -03	4.6 0.8	2.17 -05	33.1 1.6	29.32 -05	57.8 +0.1	7.31 .06	39.4 -0.1
30.0	3.76 +02	3.8 0.7	2.15 .00	31.4 1.8	29.29 .00	58.0 0.2	7.28 -01	39.4 0.0
May 10.0	3.81 .07	3.2 0.5	2.17 +04	29.5 2.0	29.31 +04	58.2 0.4	7.29 +03	39.4 +0.1
20.0	3.91 .13	2.7 0.4	2.23 .09	27.4 2.2	29.37 .09	58.7 0.5	7.35 .06	39.7 0.3
30.0	4.07 .18	2.5 -0.2	2.34 .13	25.2 2.3	29.49 .13	59.3 0.7	7.46 .13	40.0 0.4
June 8.9	4.27 .22	2.4 0.0	2.50 .17	22.8 2.4	29.64 .18	60.0 0.8	7.61 .17	40.5 0.6
18.9	4.51 .26	2.5 +0.2	2.69 .21	20.4 2.4	29.84 .21	60.9 0.9	7.80 .21	41.2 0.7
28.9	4.79 .29	2.8 0.4	2.91 .24	18.0 2.3	30.07 .25	61.9 1.1	8.03 .24	41.9 0.8
July 8.9	5.10 .32	3.4 0.6	3.17 .27	15.7 2.2	30.33 .27	63.0 1.1	8.29 .27	42.8 0.9
18.8	5.43 .34	4.1 0.8	3.45 .28	13.5 2.1	30.62 .29	64.2 1.2	8.57 .29	43.8 1.0
28.8	5.78 .35	5.0 1.0	3.74 .30	11.6 1.8	30.91 .30	65.4 1.2	8.88 .31	44.8 1.0
Aug. 7.8	6.13 .35	6.0 1.1	4.04 .30	9.9 1.5	31.23 .31	66.6 1.2	9.19 .31	45.9 1.1
17.7	6.48 .35	7.2 1.2	4.34 .30	8.5 1.2	31.54 .31	67.7 1.1	9.51 .32	47.0 1.0
27.7	6.82 .34	8.4 1.2	4.64 .29	7.5 0.8	31.85 .31	68.8 1.0	9.82 .32	48.0 1.0
Sept. 6.7	7.16 .33	9.7 1.3	4.93 .28	6.8 -0.4	32.16 .30	69.7 0.9	10.14 .31	48.9 0.9
16.7	7.48 .31	10.9 1.3	5.21 .27	6.6 0.0	32.45 .29	70.5 0.7	10.44 .30	49.7 0.8
26.6	7.78 .29	12.2 1.3	5.47 .25	6.7 +0.3	32.74 .27	71.2 0.6	10.74 .28	50.4 0.6
Oct. 6.6	8.06 .27	13.5 1.2	5.71 .23	7.3 0.7	33.00 .26	71.7 0.4	11.01 .27	51.0 0.5
16.6	8.32 .24	14.7 1.2	5.92 .20	8.1 1.0	33.25 .24	72.1 0.3	11.27 .25	51.5 0.4
26.5	8.54 .21	15.9 1.2	6.11 .18	9.3 1.3	33.47 .21	72.3 +0.2	11.51 .22	51.8 0.3
Nov. 5.5	8.74 .18	17.1 1.1	6.27 .15	10.8 1.5	33.67 .18	72.4 0.0	11.72 .20	52.1 0.2
15.5	8.90 .14	18.1 1.0	6.40 .11	12.4 1.7	33.84 .16	72.4 0.0	11.91 .17	52.3 0.1
25.5	9.03 .11	19.1 1.0	6.50 .08	14.1 1.8	33.98 .12	72.3 -0.1	12.06 .13	52.4 +0.1
Dec. 5.4	9.11 .07	20.1 0.9	6.56 .04	15.9 1.7	34.09 .09	72.2 0.2	12.17 .10	52.4 0.0
15.4	9.16 +02	20.9 0.8	6.58 +01	17.6 1.7	34.15 .05	72.0 0.2	12.25 .06	52.5 0.0
25.4	9.16 -02	21.6 0.6	6.57 -03	19.2 1.5	34.18 +01	71.8 0.2	12.29 +02	52.5 0.0
35.4	9.11 -06	22.2 +0.5	6.53 -06	20.7 +1.3	34.17 -03	71.6 -0.2	12.23 -03	52.4 0.0

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Tauri. (Aldebaran.)		$\gamma$ Camelopardalis.		$\epsilon$ Aurigæ.		$\iota$ Orionis.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	<sup>h</sup> 4 28	<sup>m</sup> 16 14	<sup>h</sup> 4 41	<sup>m</sup> 66 7	<sup>h</sup> 4 48	<sup>m</sup> 32 57	<sup>h</sup> 4 57	<sup>m</sup> 15 13
Jan. 1.4	34.73 .00	60.2 -0.9	21.21 -0.08	24.5 +2.4	39.76 +0.01	42.6 +0.8	15.57 +0.01	25.7 -0.3
11.4	34.70 -0.05	60.0 0.2	21.08 .17	26.8 2.2	39.75 -0.04	43.4 0.7	15.57 -0.03	25.4 0.2
21.4	34.63 .09	59.8 0.2	20.85 .27	28.8 1.8	39.68 .09	44.0 0.6	15.52 .07	25.2 0.2
31.3	34.53 .12	59.7 0.2	20.54 .35	30.4 1.4	39.57 .13	44.5 0.4	15.43 .11	25.1 0.2
Feb. 10.3	34.39 .15	59.5 0.2	20.16 .41	31.6 1.0	39.42 .16	44.9 0.3	15.31 .14	24.9 0.1
20.3	34.23 .16	59.3 0.2	19.73 .45	32.4 +0.5	39.24 .19	45.0 +0.1	15.16 .16	24.8 0.1
Mar. 1.2	34.06 .17	59.1 0.2	19.27 .46	32.6 0.0	39.05 .20	45.0 -0.1	14.99 .17	24.7 0.1
11.2	33.89 .17	58.9 0.2	18.80 .46	32.4 -0.5	38.85 .20	44.8 0.3	14.82 .17	24.6 0.1
21.2	33.73 .15	58.8 0.1	18.36 .43	31.6 0.9	38.65 .19	44.5 0.4	14.65 .16	24.5 -0.1
31.2	33.58 .13	58.6 -0.1	17.95 .38	30.5 1.3	38.47 .16	44.0 0.5	14.49 .15	24.5 0.0
Apr. 10.1	33.46 .10	58.6 0.0	17.60 .31	29.0 1.7	38.32 .13	43.4 0.6	14.36 .12	24.5 0.0
20.1	33.38 .06	58.5 0.0	17.34 .29	27.1 1.9	38.21 .09	42.8 0.7	14.25 .08	24.5 +0.1
30.1	33.34 -0.02	58.6 +0.2	17.16 .13	25.1 2.1	38.14 -0.04	42.1 0.7	14.19 -0.04	24.7 0.2
May 10.1	33.34 +0.03	58.9 0.3	17.08 -0.02	22.9 2.2	38.13 +0.01	41.4 0.6	14.17 .00	25.0 0.3
20.0	33.39 .07	59.2 0.4	17.11 +0.08	20.6 2.2	38.16 .06	40.8 0.6	14.19 +0.05	25.3 0.4
30.0	33.49 .12	59.7 0.6	17.24 .18	18.4 2.2	38.25 .11	40.3 0.5	14.26 .09	25.8 0.5
June 9.0	33.63 .16	60.3 0.7	17.47 .28	16.3 2.0	38.39 .16	39.8 0.3	14.38 .14	26.4 0.7
18.9	33.82 .20	61.1 0.8	17.80 .37	14.3 1.8	38.58 .21	39.6 -0.2	14.53 .18	27.1 0.8
28.9	34.04 .24	62.0 0.9	18.21 .45	12.6 1.6	38.81 .25	39.5 0.0	14.73 .21	28.0 0.9
July 8.9	34.29 .26	63.0 1.0	18.69 .52	11.1 1.3	39.08 .28	39.5 +0.1	14.96 .24	28.9 0.9
18.9	34.56 .28	64.0 1.1	19.24 .57	10.0 1.0	39.37 .31	39.7 0.2	15.21 .27	29.8 1.0
28.8	34.85 .30	65.1 1.1	19.84 .62	9.2 0.6	39.69 .33	40.0 0.4	15.49 .28	30.8 1.0
Aug. 7.8	35.16 .31	66.2 1.1	20.48 .65	8.7 -0.3	40.03 .34	40.4 0.5	15.78 .30	31.7 0.9
17.8	35.47 .31	67.2 1.0	21.15 .67	8.6 +0.1	40.38 .35	41.0 0.6	16.08 .30	32.6 0.9
27.8	35.79 .31	68.2 0.9	21.82 .68	8.8 0.4	40.73 .35	41.6 0.7	16.39 .31	33.5 0.8
Sept. 6.7	36.09 .30	69.0 0.8	22.51 .68	9.4 0.8	41.09 .35	42.3 0.7	16.70 .31	34.2 0.6
16.7	36.40 .30	69.8 0.7	23.18 .66	10.4 1.1	41.44 .34	43.0 0.8	17.00 .30	34.8 0.5
26.7	36.69 .28	70.4 0.5	23.83 .64	11.6 1.4	41.78 .34	43.8 0.8	17.30 .30	35.2 0.4
Oct. 6.6	36.97 .27	70.8 0.4	24.46 .61	13.2 1.7	42.11 .32	44.6 0.8	17.60 .28	35.5 0.2
16.6	37.22 .25	71.2 0.2	25.05 .56	15.1 2.0	42.42 .30	45.4 0.8	17.87 .27	35.6 +0.1
26.6	37.46 .23	71.3 +0.1	25.59 .51	17.2 2.2	42.71 .28	46.2 0.8	18.13 .25	35.6 0.0
Nov. 5.6	37.68 .20	71.4 0.0	26.07 .44	19.5 2.4	42.98 .25	47.1 0.8	18.37 .23	35.5 -0.2
15.5	37.87 .17	71.4 0.0	26.48 .37	22.1 2.6	43.21 .29	47.9 0.8	18.58 .20	35.3 0.2
25.5	38.02 .14	71.3 -0.1	26.81 .29	24.7 2.7	43.41 .18	48.8 0.9	18.77 .17	35.1 0.3
Dec. 5.5	38.15 .10	71.2 0.1	27.05 .19	27.4 2.7	43.57 .14	49.6 0.9	18.92 .13	34.8 0.3
15.5	38.23 .06	71.0 0.2	27.19 +0.09	30.1 2.7	43.60 .09	50.5 0.8	19.03 .09	34.5 0.3
25.4	38.27 +0.02	70.9 0.2	27.24 -0.01	32.7 2.5	43.76 +0.04	51.3 0.8	19.10 .05	34.2 0.3
35.4	38.27 -0.02	70.7 -0.2	27.18 -0.11	35.1 +2.3	43.78 -0.01	52.0 +0.7	19.12 +0.01	34.0 -0.2

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	<i>α</i> Aurigæ. ( <i>Capella</i> .)			<i>β</i> Orionis. ( <i>Rigel</i> .)			<i>β</i> Tauri.			*Groombridge 966.		
	Right Ascension.	Declination North.		Right Ascension.	Declination South.		Right Ascension.	Declination North.		Right Ascension.	Declination North.	
	<sup>h</sup> 5	<sup>m</sup> 7	<sup>s</sup> 45 51'	<sup>h</sup> 5	<sup>m</sup> 8	<sup>s</sup> 8 20'	<sup>h</sup> 5	<sup>m</sup> 18	<sup>s</sup> 28 29'	<sup>h</sup> 5	<sup>m</sup> 22	<sup>s</sup> 74 57'
Jan. 1.4	14.52	+03	57.6 +1.5	23.55	+01	68.1 +1.5	12.30	+04	50.3 +0.5	39.96	-03	18.1 +2.9
11.4	14.51	-04	50.0 1.4	23.54	-03	60.5 1.4	12.32	-01	50.8 0.5	39.85	.19	20.9 2.7
21.4	14.44	.10	60.3 1.2	23.48	.07	70.8 1.1	12.28	.06	51.3 0.4	39.58	.34	23.5 2.4
31.4	14.31	.15	61.4 1.0	23.39	.11	71.8 0.9	12.20	.10	51.7 0.4	39.16	.48	25.7 2.1
Feb. 10.3	14.14	.19	62.3 0.7	23.27	.14	72.6 0.7	12.08	.14	52.1 0.3	38.61	.60	27.6 1.6
20.3	13.93	.23	62.9 0.4	23.12	.16	73.2 0.4	11.92	.17	52.3 0.3	37.97	.68	29.0 1.1
Mar. 1.3	13.69	.24	63.2 +0.1	22.95	.17	73.5 +0.2	11.74	.19	52.4 +0.1	37.25	.73	29.8 +0.6
11.2	13.44	.25	63.1 -0.2	22.77	.18	73.6 -0.1	11.55	.19	52.4 -0.1	36.50	.75	30.2 0.0
21.2	13.19	.24	62.8 0.5	22.59	.17	73.4 0.3	11.36	.19	52.3 0.2	35.75	.73	29.9 -0.5
31.2	12.96	.22	62.2 0.7	22.42	.16	72.9 0.6	11.18	.17	52.1 0.3	35.04	.68	29.2 1.0
Apr. 10.2	12.76	.18	61.4 0.9	22.28	.13	72.2 0.8	11.02	.14	51.7 0.4	34.39	.59	28.0 1.4
20.1	12.60	.13	60.3 1.1	22.16	.10	71.3 1.1	10.89	.11	51.3 0.4	33.85	.49	26.3 1.8
30.1	12.49	.08	59.1 1.2	22.07	.06	70.1 1.3	10.81	.06	51.0 0.4	33.42	.36	24.3 2.1
May 10.1	12.44	-02	57.9 1.3	22.03	-02	69.7 1.5	10.76	-02	50.5 0.4	33.13	.21	22.0 2.4
20.1	12.45	+04	56.6 1.3	22.03	+02	67.1 1.7	10.77	+03	50.2 0.3	33.00	-06	19.5 2.5
30.0	12.53	.10	55.3 1.2	22.07	.06	65.4 1.8	10.83	.08	49.8 0.3	33.01	+09	17.0 2.6
June 9.0	12.66	.16	54.1 1.1	22.16	.11	63.5 1.9	10.93	.13	49.6 0.2	33.18	.25	14.4 2.5
19.0	12.86	.22	53.0 1.0	22.28	.15	61.5 2.0	11.08	.17	49.5 -0.1	33.51	.39	11.9 2.4
28.9	13.10	.27	52.0 0.9	22.45	.18	59.5 2.0	11.28	.21	49.4 0.0	33.97	.53	9.6 2.3
July 8.9	13.39	.31	51.3 0.7	22.65	.21	57.5 2.0	11.51	.25	49.5 +0.1	34.57	.65	7.4 2.0
18.9	13.72	.34	50.7 0.5	22.87	.24	55.5 1.9	11.77	.27	49.7 0.2	35.27	.76	5.5 1.7
28.9	14.08	.37	50.3 0.3	23.12	.26	53.7 1.7	12.06	.30	50.0 0.3	36.08	.85	3.9 1.4
Aug. 7.8	14.47	.39	50.1 -0.1	23.39	.27	52.0 1.5	12.37	.32	50.3 0.4	36.97	.92	2.6 1.1
17.8	14.87	.41	50.1 +0.1	23.67	.28	50.6 1.3	12.69	.33	50.7 0.4	37.93	.98	1.7 0.7
27.8	15.29	.42	50.3 0.3	23.96	.29	49.5 0.9	13.03	.33	51.1 0.4	38.93	1.02	1.2 -0.3
Sept. 6.8	15.70	.49	50.7 0.5	24.25	.29	48.7 0.6	13.36	.34	51.6 0.5	39.97	1.04	1.1 +0.1
16.7	16.12	.49	51.3 0.8	24.54	.29	48.3 -0.2	13.70	.34	52.1 0.4	41.01	1.04	1.4 0.5
26.7	16.54	.41	52.0 0.6	24.83	.28	48.2 +0.1	14.04	.33	52.5 0.4	42.05	1.03	2.0 0.9
Oct. 6.7	16.94	.39	52.9 0.9	25.11	.27	48.5 0.5	14.36	.30	52.9 0.4	43.06	1.00	3.1 1.3
16.6	17.32	.37	53.9 1.1	25.37	.26	49.2 0.8	14.68	.31	53.4 0.4	44.04	.96	4.5 1.6
26.6	17.68	.35	55.0 1.2	25.62	.24	50.2 1.1	14.98	.29	53.8 0.4	44.96	.87	6.4 2.0
Nov. 5.6	18.02	.32	56.3 1.3	25.85	.22	51.5 1.4	15.27	.27	54.2 0.4	45.79	.78	8.5 2.3
15.6	18.32	.28	57.7 1.4	26.05	.19	52.9 1.5	15.52	.24	54.6 0.4	46.52	.68	10.9 2.6
25.5	18.58	.23	59.2 1.5	26.23	.16	54.5 1.7	15.75	.21	55.0 0.4	47.14	.55	13.6 2.8
Dec. 5.5	18.79	.18	60.7 1.5	26.37	.12	56.2 1.7	15.93	.17	55.5 0.5	47.62	.41	16.5 2.9
15.5	18.94	.13	62.3 1.6	26.47	.08	58.0 1.7	16.08	.12	55.9 0.5	47.95	.25	19.4 3.0
25.5	19.04	.07	63.8 1.5	26.53	+04	59.6 1.6	16.18	.08	56.4 0.5	48.12	+08	22.4 3.0
35.4	19.08	+01	65.3 +1.4	26.55	.00	61.1 +1.4	16.23	+03	56.9 +0.5	48.13	-06	25.4 +2.8

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\delta$ Orionis.		$\alpha$ Leporis.		$\epsilon$ Orionis.		$\alpha$ Columbe.	
	Right Ascension.	Declination South.	Right Ascension	Declination South.	Right Ascension.	Declination South.	Right Ascension.	Declination South.
	<sup>h</sup> 5 <sup>m</sup> 25	<sup>°</sup> 0 <sup>'</sup> 23	<sup>h</sup> 5 <sup>m</sup> 27	<sup>°</sup> 17 <sup>'</sup> 54	<sup>h</sup> 5 <sup>m</sup> 29	<sup>°</sup> 1 <sup>'</sup> 16	<sup>h</sup> 5 <sup>m</sup> 34	<sup>°</sup> 34 <sup>'</sup> 8
Jan. 1.4	28.39 +.03	47.2 +1.2	5.67 +.02	59.2 +2.1	43.44 +.04	69.9 +1.2	61.80 .00	40.8 +2.8
11.4	28.40 -.01	48.3 1.0	5.67 -.03	61.1 1.8	43.46 -.01	71.1 1.1	61.77 -.05	43.5 2.5
21.4	28.37 .05	49.2 0.9	5.62 .07	62.9 1.6	43.43 .05	72.1 0.9	61.69 .10	45.8 2.1
31.4	28.30 .09	50.1 0.7	5.52 .11	64.3 1.3	43.36 .09	73.0 0.8	61.56 .15	47.7 1.8
Feb. 10.3	28.19 .12	50.7 0.5	5.39 .14	65.5 1.0	43.25 .12	73.6 0.6	61.39 .18	49.3 1.4
20.3	28.05 .15	51.2 0.4	5.23 .17	66.3 0.7	43.11 .15	74.1 0.4	61.19 .21	50.5 0.9
Mar. 1.3	27.89 .17	51.5 +0.2	5.05 .19	66.8 +0.3	42.95 .17	74.4 +0.2	60.97 .23	51.2 +0.5
11.3	27.72 .17	51.5 0.0	4.86 .19	67.0 0.0	42.78 .17	74.5 0.0	60.73 .24	51.5 0.0
21.2	27.54 .17	51.4 -0.2	4.66 .19	66.8 -0.3	42.60 .17	74.4 -0.2	60.49 .24	51.3 -0.4
31.2	27.38 .16	51.2 0.3	4.48 .18	66.3 0.7	42.43 .16	74.2 0.4	60.26 .23	50.6 0.8
Apr. 10.2	27.23 .14	50.7 0.5	4.31 .15	65.4 1.0	42.28 .14	73.7 0.5	60.04 .20	49.6 1.3
20.1	27.11 .11	50.1 0.7	4.17 .12	64.3 1.3	42.16 .11	73.1 0.7	59.85 .17	48.1 1.7
30.1	27.02 .07	49.3 0.9	4.06 .09	62.8 1.6	42.07 .07	72.3 0.9	59.70 .13	46.3 2.0
May 10.1	26.97 -.03	48.3 1.1	3.99 .05	61.1 1.8	42.02 -.03	71.2 1.1	59.59 .09	44.1 2.3
20.1	26.96 +.01	47.2 1.2	3.96 -.01	59.2 2.0	42.00 +.01	70.1 1.3	59.52 -.04	41.7 2.6
30.0	26.99 .05	45.9 1.3	3.98 +.04	57.1 2.2	42.03 .05	68.7 1.4	59.50 .00	39.0 2.8
June 9.0	27.07 .10	44.5 1.5	4.04 .06	54.8 2.3	42.10 .09	67.3 1.5	59.53 +.05	36.1 2.9
19.0	27.19 .14	43.0 1.5	4.14 .12	52.4 2.4	42.22 .13	65.7 1.6	59.60 .10	33.1 3.0
29.0	27.34 .17	41.4 1.6	4.28 .16	50.0 2.4	42.37 .17	64.1 1.7	59.73 .14	30.1 3.0
July 8.9	27.53 .20	39.8 1.6	4.46 .19	47.6 2.3	42.55 .20	62.5 1.6	59.89 .18	27.1 2.9
18.9	27.75 .23	38.2 1.5	4.67 .22	45.3 2.2	42.77 .23	60.9 1.6	60.09 .22	24.3 2.7
28.9	27.99 .25	36.7 1.4	4.90 .25	43.2 2.0	43.01 .25	59.4 1.5	60.33 .25	21.7 2.5
Aug. 7.8	28.25 .27	35.4 1.3	5.16 .27	41.2 1.8	43.26 .26	58.0 1.3	60.60 .26	19.3 2.2
17.8	28.53 .28	34.2 1.1	5.43 .28	39.6 1.5	43.54 .28	56.8 1.1	60.89 .20	17.4 1.7
27.8	28.81 .29	33.2 0.8	5.72 .29	38.3 1.1	43.82 .29	55.8 0.9	61.19 .21	15.9 1.3
Sept. 6.8	29.10 .29	32.5 0.6	6.01 .30	37.4 0.7	44.11 .29	55.1 0.6	61.51 .22	14.8 0.7
16.7	29.40 .29	32.0 -0.3	6.31 .30	37.0 -0.2	44.40 .29	54.6 -0.3	61.83 .22	14.4 -0.2
26.7	29.69 .29	31.9 0.0	6.61 .29	37.0 +0.2	44.69 .29	54.5 0.0	62.16 .22	14.4 +0.3
Oct. 6.7	29.97 .28	32.1 +0.3	6.89 .28	37.5 0.7	44.98 .28	54.7 +0.3	62.47 .21	15.1 0.9
16.7	30.25 .27	32.5 0.6	7.17 .27	38.3 1.1	45.26 .27	55.2 0.6	62.78 .20	16.3 1.4
26.6	30.51 .26	33.2 0.8	7.44 .25	39.6 1.5	45.52 .26	55.9 0.9	63.06 .27	17.9 1.9
Nov. 5.6	30.76 .23	34.1 1.0	7.68 .23	41.3 1.8	45.77 .24	56.9 1.1	63.32 .25	20.0 2.3
15.6	30.98 .21	35.3 1.2	7.89 .20	43.2 2.0	45.99 .21	58.1 1.2	63.56 .21	22.5 2.6
25.5	31.17 .18	36.5 1.3	8.08 .17	45.3 2.2	46.19 .18	59.4 1.3	63.75 .17	25.2 2.8
Dec. 5.5	31.34 .14	37.8 1.3	8.23 .13	47.5 2.2	46.36 .15	60.8 1.4	63.90 .13	28.2 2.9
15.5	31.46 .11	39.2 1.3	8.34 .09	49.8 2.2	46.49 .11	62.2 1.4	64.01 .08	31.1 2.9
25.5	31.55 .06	40.4 1.2	8.41 +.05	52.0 2.1	46.57 .07	63.5 1.3	64.06 +.03	34.0 2.8
35.4	31.59 +.02	41.6 +1.1	8.44 .00	54.1 +1.9	46.62 +.02	64.8 +1.2	64.07 -.02	36.7 +2.6

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Orionis.			*22 Camelop. (H.)			$\mu$ Geminorum.			$\alpha$ Argus. (Canopus.)		
	Right Ascension.	Declination North.		Right Ascension.	Declination North.		Right Ascension.	Declination North.		Right Ascension.	Declination South.	
	<sup>h</sup> 5	<sup>m</sup> 48	<sup>°</sup> 7	<sup>h</sup> 6	<sup>m</sup> 4	<sup>°</sup> 69	<sup>h</sup> 6	<sup>m</sup> 15	<sup>°</sup> 22	<sup>h</sup> 6	<sup>m</sup> 21	<sup>°</sup> 52
Jan. 1.5	14.84 +.06	51.6 -0.8		45.74 +.12	40.8 +2.7		13.32 +.10	38.1 +0.1		8.53 .00	36.4 +3.4	
11.5	14.88 +.01	50.9 0.7		45.80 .09	43.5 2.6		13.39 +.05	38.2 0.1		8.50 -0.7	39.7 3.2	
21.4	14.87 -0.03	50.2 0.6		45.73 -0.13	46.1 2.5		13.41 .00	38.3 0.2		8.39 .14	42.8 2.9	
31.4	14.82 .07	49.7 0.5		45.54 .35	48.5 2.2		13.38 -0.05	38.6 0.3		8.23 .30	45.6 2.5	
Feb. 10.4	14.73 .11	49.3 0.3		45.24 .35	50.6 1.9		13.31 .10	38.8 0.3		8.00 .35	47.9 2.1	
20.3	14.60 .14	49.0 0.2		44.85 .43	52.3 1.5		13.19 .13	39.1 0.3		7.72 .30	49.8 1.7	
Mar. 1.3	14.45 .16	48.9 -0.1		44.38 .49	53.6 1.0		13.04 .16	39.4 0.2		7.40 .33	51.3 1.2	
11.3	14.28 .17	48.8 0.0		43.86 .53	54.4 0.6		12.87 .18	39.6 0.2		7.06 .35	52.2 0.6	
21.3	14.10 .17	48.9 +0.1		43.33 .53	54.7 +0.1		12.69 .18	39.7 0.1		6.69 .36	52.5 +0.1	
31.2	13.93 .16	49.0 0.2		42.80 .52	54.5 -0.4		12.50 .18	39.8 +0.1		6.34 .35	52.4 -0.4	
Apr. 10.2	13.78 .14	49.3 0.3		42.30 .47	53.8 0.9		12.33 .16	39.9 0.0		5.99 .34	51.8 0.9	
20.2	13.65 .12	49.6 0.4		41.85 .41	52.7 1.3		12.19 .13	39.9 0.0		5.67 .31	50.6 1.4	
30.2	13.55 .08	50.1 0.5		41.49 .32	51.2 1.7		12.07 .10	39.9 0.0		5.37 .27	49.0 1.8	
May 10.1	13.49 -0.04	50.7 0.6		41.21 .23	49.4 2.0		11.99 .06	39.8 0.0		5.13 .22	47.0 2.2	
20.1	13.47 .00	51.4 0.8		41.03 .12	47.3 2.2		11.94 -0.02	39.8 0.0		4.93 .17	44.5 2.6	
30.1	13.48 +0.04	52.2 0.9		40.97 -0.01	45.0 2.3		11.95 +0.02	39.8 0.0		4.79 .11	41.8 2.9	
June 9.0	13.55 .08	53.1 1.0		41.01 +0.10	42.6 2.4		11.99 .07	39.8 0.0		4.70 -0.05	38.7 3.1	
19.0	13.65 .12	54.1 1.0		41.17 .21	40.3 2.4		12.08 .11	39.8 +0.1		4.68 +0.01	35.5 3.2	
29.0	13.79 .16	55.2 1.1		41.44 .32	37.9 2.3		12.21 .15	39.9 0.1		4.72 .07	32.2 3.3	
July 9.0	13.97 .19	56.3 1.1		41.80 .41	35.7 2.2		12.38 .19	40.1 0.2		4.81 .13	28.9 3.3	
18.9	14.18 .22	57.4 1.1		42.26 .50	33.6 2.0		12.59 .22	40.2 0.2		4.97 .18	25.6 3.2	
28.9	14.41 .24	58.5 1.0		42.80 .58	31.7 1.8		12.82 .25	40.4 0.2		5.18 .23	22.5 3.0	
Aug. 7.9	14.66 .26	59.5 0.9		43.41 .64	30.1 1.5		13.08 .27	40.6 0.2		5.44 .26	19.6 2.7	
17.9	14.93 .28	60.4 0.8		44.08 .69	28.7 1.2		13.35 .29	40.8 0.2		5.74 .32	17.2 2.2	
27.8	15.22 .29	61.2 0.6		44.80 .74	27.7 0.9		13.65 .30	41.0 0.1		6.09 .36	15.1 1.8	
Sept. 6.8	15.51 .29	61.7 0.5		45.55 .77	26.9 0.5		13.96 .31	41.1 +0.1		6.46 .38	13.6 1.2	
16.8	15.81 .30	62.1 +0.2		46.33 .78	26.6 -0.2		14.27 .32	41.1 0.0		6.85 .40	12.7 -0.6	
26.7	16.10 .30	62.2 0.0		47.12 .79	26.6 +0.2		14.60 .33	41.1 -0.1		7.26 .41	12.4 0.0	
Oct. 6.7	16.40 .29	62.1 -0.2		47.91 .78	26.9 0.5		14.93 .32	40.9 0.1		7.67 .41	12.7 +0.6	
16.7	16.69 .29	61.8 0.4		48.69 .76	27.6 0.9		15.25 .32	40.8 0.2		8.07 .39	13.7 1.3	
26.7	16.97 .27	61.3 0.6		49.44 .73	28.7 1.3		15.57 .31	40.5 0.2		8.46 .37	15.3 1.9	
Nov. 5.6	17.24 .26	60.6 0.8		50.15 .68	30.1 1.6		15.88 .30	40.3 0.2		8.82 .34	17.4 2.4	
15.6	17.49 .23	59.8 0.9		50.80 .62	31.9 1.9		16.17 .28	40.0 0.2		9.14 .30	20.0 2.8	
25.6	17.71 .21	58.9 0.9		51.38 .53	34.0 2.2		16.43 .25	39.8 0.2		9.41 .25	23.1 3.2	
Dec. 5.6	17.90 .17	57.9 0.9		51.87 .44	36.3 2.4		16.67 .22	39.6 0.2		9.63 .19	26.4 3.4	
15.5	18.05 .13	57.0 0.9		52.25 .33	38.8 2.6		16.87 .18	39.5 -0.1		9.79 .12	29.8 3.5	
25.5	18.17 .09	56.1 0.8		52.52 .21	41.5 2.7		17.02 .14	39.4 0.0		9.87 +0.05	33.3 3.5	
35.5	18.24 +0.05	55.3 -0.7		52.67 +0.08	44.2 +2.7		17.13 +0.09	39.5 +0.1		9.89 -0.02	36.7 +3.3	

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\gamma$ Geminorum.		$\alpha$ Canis Majoris. (Sirius.)		$\epsilon$ Canis Majoris.		$\delta$ Canis Majoris.	
	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination South.	Right Ascension.	Declination South.
	<sup>h</sup> 6 <sup>m</sup> 30	<sup>°</sup> 16 <sup>'</sup> 30	<sup>h</sup> 6 <sup>m</sup> 39	<sup>°</sup> 16 <sup>'</sup> 32	<sup>h</sup> 6 <sup>m</sup> 53	<sup>°</sup> 28 <sup>'</sup> 47	<sup>h</sup> 7 <sup>m</sup> 3	<sup>°</sup> 26 <sup>'</sup> 11
Jan. 1.5	19.35 +.11	23.8 -0.4	30.88 +.09	32.7 +2.3	36.58 +.09	56.0 +2.9	11.98 +.10	25.7 +2.8
11.5	19.43 .06	23.5 .2	30.94 +.04	34.9 .2	36.64 +.04	58.8 .2	12.06 +.05	28.4 .2
21.5	19.47 +.01	23.3 -0.1	30.95 -0.1	37.0 .2	36.65 -0.2	61.4 .2	12.08 .00	31.0 .2
31.4	19.45 -0.4	23.2 0.0	30.92 .06	38.8 1.7	36.61 .07	63.8 .2	12.05 -0.05	33.4 .2
Feb. 10.4	19.39 .06	23.2 0.0	30.84 .10	40.4 1.4	36.52 .11	65.9 1.9	11.98 .10	35.4 1.9
20.4	19.29 .12	23.2 +0.1	30.72 .14	41.6 1.1	36.38 .15	67.6 1.5	11.86 .14	37.1 1.5
Mar. 1.3	19.15 .15	23.4 0.1	30.57 .16	42.6 0.8	36.21 .18	69.0 1.1	11.70 .17	38.5 1.2
11.3	18.99 .17	23.5 .2	30.39 .18	43.2 0.5	36.02 .20	69.9 0.7	11.52 .19	39.4 0.8
21.3	18.82 .17	23.7 .2	30.21 .19	43.5 +0.1	35.81 .22	70.5 +0.3	11.32 .20	40.0 +0.4
31.3	18.64 .17	23.8 .2	30.01 .19	43.5 -0.2	35.59 .22	70.6 -0.1	11.11 .21	40.2 0.0
Apr. 10.2	18.47 .16	24.0 .2	29.83 .18	43.2 0.5	35.37 .21	70.3 0.5	10.90 .20	40.0 -0.4
20.2	18.33 .14	24.2 .2	29.66 .16	42.5 0.8	35.17 .19	69.6 0.9	10.71 .18	39.4 0.8
30.2	18.20 .11	24.4 .2	29.51 .13	41.5 1.1	34.99 .16	68.6 1.2	10.53 .16	38.4 1.1
May 10.2	18.11 .07	24.6 .2	29.39 .10	40.3 1.3	34.84 .13	67.1 1.6	10.38 .13	37.1 1.5
20.1	18.06 -0.03	24.8 0.3	29.31 .06	38.9 1.6	34.73 .10	65.4 1.9	10.27 .10	35.5 1.7
30.1	18.05 +0.01	25.1 0.3	29.27 -0.03	37.2 1.8	34.65 .06	63.4 2.1	10.19 .06	33.6 2.0
June 9.1	18.08 .05	25.5 0.3	29.26 +0.01	35.3 1.9	34.61 -0.02	61.1 2.4	10.15 -0.02	31.5 2.2
19.0	18.15 .09	25.8 0.4	29.30 .05	33.3 2.1	34.61 +0.02	58.6 2.5	10.15 +0.02	29.2 2.4
29.0	18.26 .13	26.2 0.4	29.37 .09	31.2 2.1	34.66 .06	56.1 2.6	10.19 .06	26.7 2.5
July 9.0	18.41 .16	26.7 0.4	29.48 .13	29.0 2.1	34.74 .10	53.4 2.6	10.26 .10	24.2 2.5
19.0	18.59 .19	27.1 0.4	29.62 .16	26.9 2.1	34.87 .14	50.8 2.6	10.38 .13	21.7 2.5
28.9	18.80 .22	27.6 0.4	29.80 .19	24.9 1.9	35.03 .18	48.3 2.4	10.53 .17	19.3 2.4
Aug. 7.9	19.04 .25	28.0 0.4	30.00 .21	23.0 1.7	35.22 .21	45.9 2.2	10.71 .20	17.0 2.1
17.9	19.30 .27	28.3 0.3	30.23 .24	21.4 1.5	35.44 .24	43.8 1.9	10.93 .23	15.0 1.9
27.9	19.57 .28	28.6 0.2	30.48 .26	20.1 1.2	35.69 .26	42.0 1.6	11.16 .25	13.3 1.5
Sept. 6.8	19.86 .30	28.8 +0.1	30.74 .27	19.1 0.8	35.96 .26	40.7 1.1	11.42 .27	11.9 1.1
16.8	20.16 .30	28.8 0.0	31.02 .29	18.5 -0.4	36.25 .30	39.8 0.6	11.71 .29	11.1 0.6
26.8	20.47 .31	28.7 -0.2	31.31 .29	18.3 +0.1	36.55 .31	39.4 -0.1	12.00 .30	10.7 -0.1
Oct. 6.7	20.78 .31	28.4 0.3	31.61 .30	18.7 0.5	36.87 .31	39.6 +0.4	12.31 .31	10.8 +0.4
16.7	21.10 .31	28.1 0.4	31.91 .30	19.4 0.9	37.18 .32	40.3 0.9	12.62 .31	11.4 0.9
26.7	21.41 .31	27.6 0.5	32.21 .29	20.5 1.3	37.50 .31	41.5 1.4	12.94 .31	12.6 1.4
Nov. 5.7	21.72 .30	27.0 0.6	32.49 .28	22.1 1.7	37.80 .30	43.1 1.9	13.24 .30	14.2 1.8
15.6	22.01 .28	26.4 0.6	32.76 .26	24.0 2.0	38.09 .28	45.3 2.3	13.54 .28	16.2 2.2
25.6	22.27 .25	25.8 0.6	33.01 .23	26.1 2.2	38.36 .25	47.7 2.6	13.81 .26	18.6 2.5
Dec. 5.6	22.51 .22	25.1 0.6	33.23 .20	28.4 2.4	38.59 .21	50.4 2.8	14.05 .22	21.2 2.7
15.6	22.72 .18	24.6 0.5	33.41 .16	30.8 2.4	38.79 .17	53.3 2.9	14.25 .18	24.0 2.8
25.5	22.88 .14	24.1 0.4	33.56 .12	33.2 2.4	38.93 .12	56.2 2.9	14.41 .14	26.8 2.8
35.5	23.00 +0.09	23.7 -0.3	33.65 +0.07	35.5 +2.3	39.03 +0.07	59.1 +2.8	14.53 +0.09	29.6 +2.8

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\delta$ Geminorum.		*Piazzi vii. 67.		$\alpha$ Geminorum. (Castor.)		$\alpha$ Canis Minoris. (Procyon.)	
	Right Ascension.	Declination North.	Right Ascension	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	<sup>h</sup> 7 <sup>m</sup> 12	<sup>°</sup> 22 <sup>'</sup> 12	<sup>h</sup> 7 <sup>m</sup> 17	<sup>°</sup> 68 <sup>'</sup> 43	<sup>h</sup> 7 <sup>m</sup> 26	<sup>°</sup> 32 <sup>'</sup> 9	<sup>h</sup> 7 <sup>m</sup> 32	<sup>°</sup> 5 <sup>'</sup> 32
Jan. 1.5	28.96 +.16	57.8 -0.1	34.20 +.31	21.5 +2.4	25.86 +.19	60.2 +0.4	36.42 +.16	65.2 -1.3
11.5	29.09 .11	57.7 0.0	34.45 .19	24.1 2.6	26.02 .13	60.7 0.6	36.55 .11	64.0 1.1
21.5	29.17 +.05	57.8 +0.1	34.59 +.06	26.7 2.6	26.13 .07	61.4 0.7	36.64 .06	63.0 0.9
31.5	29.20 .00	58.0 0.3	34.58 -.06	29.3 2.6	26.17 +.02	62.1 0.8	36.68 +.01	62.2 0.8
Feb. 10.4	29.17 -.05	58.3 0.3	34.46 .18	31.9 2.4	26.16 -.04	63.0 0.9	36.66 -.04	61.5 0.6
20.4	29.10 .09	58.6 0.4	34.22 .29	34.2 2.2	26.09 .09	63.9 0.9	36.60 .08	61.0 0.4
Mar. 1.4	28.99 .13	59.1 0.4	33.89 .38	36.2 1.8	25.98 .13	64.7 0.8	36.51 .11	60.7 0.2
11.3	28.84 .16	59.5 0.4	33.47 .44	37.8 1.4	25.83 .16	65.5 0.7	36.38 .14	60.5 -0.1
21.3	28.67 .17	59.9 0.4	33.00 .48	39.0 1.0	25.66 .18	66.2 0.6	36.23 .16	60.5 0.0
31.3	28.50 .18	60.2 0.3	32.50 .50	39.7 +0.5	25.47 .19	66.7 0.5	36.06 .16	60.6 +0.2
Apr. 10.3	28.32 .17	60.5 0.2	31.99 .49	39.9 0.0	25.28 .19	67.1 0.3	35.90 .16	60.9 0.3
20.2	28.16 .15	60.7 0.2	31.51 .46	39.7 -0.5	25.09 .17	67.3 +0.1	35.74 .15	61.2 0.4
30.2	28.02 .13	60.9 0.1	31.07 .41	38.9 1.0	24.93 .15	67.3 0.0	35.60 .13	61.6 0.5
May 10.2	27.90 .10	61.0 +0.1	30.68 .34	37.8 1.4	24.79 .12	67.2 -0.2	35.48 .10	62.1 0.6
20.2	27.82 .06	61.0 0.0	30.38 .26	36.2 1.7	24.69 .08	66.9 0.3	35.39 .08	62.7 0.6
30.1	27.78 -.02	61.1 0.0	30.16 .17	34.3 2.0	24.63 -.04	66.5 0.4	35.33 .04	63.4 0.7
June 9.1	27.77 +.02	61.1 0.0	30.04 -.07	32.2 2.2	24.60 .00	66.1 0.5	35.30 -.01	64.2 0.8
19.1	27.81 .05	61.1 0.0	30.02 +.03	29.9 2.4	24.63 +.04	65.5 0.6	35.31 +.03	65.0 0.8
29.0	27.88 .09	61.0 0.0	30.10 .13	27.4 2.5	24.69 .08	64.9 0.6	35.36 .06	65.8 0.8
July 9.0	28.00 .13	61.0 0.0	30.28 .22	24.9 2.5	24.80 .12	64.2 0.7	35.44 .10	66.6 0.8
19.0	28.14 .16	61.0 0.0	30.55 .32	22.4 2.5	24.94 .16	63.6 0.7	35.55 .13	67.5 0.8
29.0	28.32 .19	60.9 -0.1	30.92 .41	20.0 2.4	25.12 .20	62.9 0.7	35.69 .16	68.3 0.7
Aug 7.9	28.53 .22	60.8 0.1	31.36 .48	17.6 2.3	25.33 .23	62.1 0.7	35.86 .18	69.0 0.6
17.9	28.77 .25	60.7 0.2	31.88 .55	15.4 2.1	25.57 .25	61.4 0.7	36.06 .21	69.5 0.5
27.9	29.02 .27	60.4 0.2	32.47 .62	13.5 1.9	25.84 .28	60.7 0.7	36.28 .22	70.0 0.3
Sept. 6.9	29.30 .29	60.2 0.3	33.12 .67	11.7 1.6	26.13 .30	59.9 0.8	36.52 .25	70.2 +0.1
16.8	29.60 .30	59.8 0.4	33.81 .71	10.3 1.3	26.45 .32	59.1 0.8	36.78 .27	70.2 -0.1
26.8	29.91 .32	59.3 0.5	34.54 .75	9.1 1.0	26.78 .34	58.4 0.8	37.05 .28	69.9 0.4
Oct. 6.8	30.23 .33	58.7 0.6	35.31 .77	8.3 0.6	27.12 .35	57.6 0.7	37.34 .30	69.4 0.6
16.7	30.56 .33	58.1 0.6	36.08 .78	7.9 -0.2	27.48 .36	56.9 0.7	37.65 .31	68.7 0.8
26.7	30.90 .33	57.5 0.7	36.86 .77	7.8 +0.1	27.84 .36	56.2 0.6	37.96 .31	67.7 1.1
Nov. 5.7	31.23 .33	56.8 0.7	37.63 .75	8.2 0.6	28.21 .36	55.7 0.5	38.27 .31	66.6 1.2
15.7	31.55 .32	56.1 0.6	38.37 .72	8.9 1.0	28.57 .35	55.3 0.4	38.57 .30	65.2 1.4
25.6	31.86 .30	55.5 0.6	39.07 .66	10.1 1.4	28.91 .33	54.9 0.3	38.86 .28	63.8 1.4
Dec. 5.6	32.14 .27	54.9 0.5	39.70 .59	11.6 1.7	29.23 .30	54.7 -0.1	39.13 .26	62.3 1.5
15.6	32.40 .23	54.5 0.4	40.25 .50	13.6 2.1	29.52 .27	54.7 +0.1	39.38 .23	60.9 1.4
25.6	32.61 .19	54.2 0.2	40.70 .39	15.8 2.3	29.77 .22	54.9 0.3	39.59 .19	59.5 1.3
35.5	32.78 +.14	54.0 -0.1	41.04 +.27	18.2 +2.5	29.97 +.17	55.3 +0.5	39.76 +.14	58.2 -1.2



## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\beta$ Geminorum. (Pollux.)		$\phi$ Geminorum.		*3 Ursæ Majoris (H.)		15 Argus ( $\iota$ )	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination South.
	<sup>h</sup> 7 <sup>m</sup> 37	<sup>°</sup> 28 <sup>'</sup> 19	<sup>h</sup> 7 <sup>m</sup> 45	<sup>°</sup> 27 <sup>'</sup> 5	<sup>h</sup> 8 <sup>m</sup> 0	<sup>°</sup> 68 <sup>'</sup> 50	<sup>h</sup> 8 <sup>m</sup> 2	<sup>°</sup> 23 <sup>'</sup> 55
Jan. 1.5	29.17 +.19	59.9 +0.1	40.01 +.30	41.8 0.0	4.44 +.48	47.0 +2.2	6.21 +.17	65.8 +2.6
11.5	29.34 .13	60.1 0.3	40.19 .15	41.9 +0.2	4.81 .30	49.3 2.5	6.35 .12	68.6 2.7
21.5	29.45 .06	60.5 0.5	40.30 .09	42.2 0.4	5.05 .18	51.9 2.6	6.44 .07	71.3 2.6
31.5	29.50 +.02	61.1 0.6	40.37 +.03	42.6 0.5	5.16 +.05	54.5 2.7	6.48 +.01	73.8 2.4
Feb. 10.4	29.50 -.03	61.7 0.7	40.37 -.02	43.2 0.6	5.15 -.08	57.2 2.6	6.46 -.04	76.1 2.1
20.4	29.44 .06	62.4 0.7	40.33 .07	43.9 0.7	5.01 .30	59.8 2.4	6.40 .06	78.1 1.8
Mar. 1.4	29.34 .12	63.1 0.7	40.23 .11	44.6 0.7	4.75 .30	62.1 2.2	6.30 .12	79.8 1.5
11.3	29.20 .15	63.8 0.7	40.11 .14	45.3 0.7	4.41 .38	64.1 1.9	6.16 .15	81.1 1.1
21.3	29.04 .17	64.5 0.6	39.95 .16	45.9 0.6	3.99 .44	65.8 1.4	5.99 .18	82.1 0.8
31.3	28.86 .18	65.0 0.5	39.78 .18	46.5 0.5	3.52 .48	67.0 1.0	5.80 .19	82.7 0.4
Apr. 10.3	28.68 .18	65.4 0.4	39.60 .18	46.9 0.4	3.02 .49	67.7 +0.5	5.62 .19	82.9 +0.1
20.2	28.50 .17	65.7 0.2	39.42 .16	47.2 0.3	2.53 .48	68.0 0.0	5.43 .18	82.8 -0.2
30.2	28.34 .15	65.9 +0.1	39.27 .15	47.5 +0.1	2.05 .45	67.8 -0.5	5.25 .17	82.3 0.6
May 10.2	28.21 .12	65.9 0.0	39.13 .12	47.5 0.0	1.62 .40	67.0 0.9	5.09 .15	81.5 1.0
20.2	28.10 .08	65.8 -0.1	39.03 .09	47.5 -0.1	1.25 .33	65.9 1.4	4.95 .13	80.3 1.3
30.1	28.04 .05	65.6 0.2	38.96 .05	47.4 0.2	0.95 .25	64.3 1.7	4.84 .09	78.9 1.6
June 9.1	28.01 -0.01	65.4 0.3	38.92 -0.01	47.2 0.2	0.74 .17	62.4 2.0	4.76 .06	77.2 1.8
19.1	28.02 +.03	65.0 0.4	38.93 +.03	46.9 0.3	0.62 -.07	60.3 2.3	4.72 -.03	75.3 2.0
29.0	28.07 .07	64.6 0.4	38.98 .06	46.6 0.4	0.60 +.02	57.9 2.5	4.71 +.01	73.3 2.1
July 9.0	28.16 .11	64.1 0.5	39.06 .10	46.2 0.4	0.67 .12	55.3 2.6	4.73 .04	71.1 2.2
19.0	28.29 .14	63.7 0.5	39.18 .14	45.8 0.5	0.83 .21	52.7 2.7	4.79 .06	68.8 2.2
29.0	28.45 .18	63.1 0.6	39.33 .17	45.3 0.5	1.09 .30	50.0 2.7	4.88 .11	66.6 2.2
Aug. 7.9	28.65 .21	62.6 0.6	39.52 .20	44.7 0.6	1.43 .38	47.4 2.6	5.01 .14	64.4 2.1
17.9	28.87 .24	62.0 0.6	39.73 .23	44.2 0.6	1.86 .46	44.8 2.5	5.16 .17	62.5 1.8
27.9	29.12 .26	61.3 0.7	39.97 .25	43.5 0.7	2.36 .54	42.3 2.3	5.35 .20	60.7 1.6
Sept. 6.9	29.39 .28	60.6 0.7	40.24 .28	42.8 0.7	2.92 .60	40.1 2.1	5.57 .23	59.3 1.2
16.8	29.69 .31	59.9 0.7	40.52 .30	42.0 0.8	3.56 .66	38.1 1.9	5.81 .26	58.3 0.8
26.8	30.00 .32	59.1 0.8	40.83 .32	41.2 0.8	4.24 .71	36.3 1.6	6.08 .28	57.7 -0.4
Oct. 6.8	30.33 .34	58.3 0.8	41.16 .33	40.4 0.9	4.97 .74	34.8 1.3	6.37 .30	57.6 +0.1
16.7	30.67 .35	57.4 0.8	41.50 .34	39.5 0.9	5.73 .77	33.7 0.9	6.68 .31	58.0 0.6
26.7	31.03 .38	56.7 0.8	41.85 .35	38.6 0.9	6.51 .78	33.0 0.5	6.99 .32	58.8 1.1
Nov. 5.7	31.38 .35	55.9 0.7	42.20 .35	37.7 0.8	7.30 .78	32.7 -0.1	7.31 .32	60.2 1.6
15.7	31.73 .34	55.2 0.6	42.55 .34	36.9 0.7	8.08 .76	32.8 +0.4	7.63 .31	62.0 2.0
25.6	32.07 .32	54.6 0.5	42.89 .32	36.2 0.6	8.83 .72	33.4 0.8	7.94 .28	64.2 2.3
Dec. 5.6	32.38 .30	54.2 0.4	43.21 .30	35.7 0.5	9.53 .67	34.4 1.2	8.23 .27	66.6 2.6
15.6	32.67 .27	53.9 -0.2	43.50 .27	35.3 0.3	10.16 .59	35.9 1.6	8.48 .24	69.3 2.7
25.6	32.91 .22	53.8 0.0	43.75 .23	35.1 -0.1	10.71 .50	37.7 2.0	8.70 .20	72.1 2.8
35.5	33.11 +.17	53.0 +0.2	43.96 +.12	35.1 +0.1	11.15 +.36	39.9 +2.3	8.88 +.15	74.9 +2.2

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\epsilon$ Hydræ.		$\iota$ Ursæ Majoris.		$\gamma^o$ Ursæ Majoris.		$\kappa$ Cancræ.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	<sup>h</sup> 8 39	<sup>m</sup> 6 53	<sup>h</sup> 8 50	<sup>m</sup> 48 32	<sup>h</sup> 8 59	<sup>m</sup> 67 36	<sup>h</sup> 9 0	<sup>m</sup> 11 10
Jan. 1.6	59.99 +.22	15.7 -1.4	26.44 +.33	27.8 +0.8	7.25 +.53	58.1 +1.6	48.83 +.35	57.0 -1.3
11.6	60.19 .18	14.4 1.2	26.74 .27	28.8 1.2	7.73 .43	60.0 2.0	49.06 .20	55.8 1.1
21.5	60.34 .13	13.2 1.0	26.96 .20	30.2 1.5	8.11 .31	62.2 2.3	49.24 .15	54.9 0.8
31.5	60.45 .08	12.3 0.8	27.14 .13	31.7 1.7	8.36 .20	64.6 2.5	49.37 .10	54.1 0.6
Feb. 10.5	60.50 +.03	11.6 0.6	27.23 +.05	33.5 1.8	8.50 +.07	67.3 2.6	49.44 +.05	53.7 0.4
20.4	60.50 -.02	11.1 0.4	27.25 -.02	35.3 1.9	8.51 -.05	69.9 2.6	49.47 .00	53.4 -0.2
Mar. 1.4	60.46 .06	10.8 -0.2	27.19 .08	37.2 1.8	8.41 .16	72.5 2.5	49.45 -.04	53.3 0.0
11.4	60.38 .10	10.7 0.0	27.08 .14	39.0 1.7	8.19 .26	75.0 2.3	49.39 .08	53.4 +0.2
21.4	60.27 .12	10.7 +0.1	26.92 .18	40.6 1.5	7.90 .34	77.2 2.0	49.29 .11	53.6 0.3
31.3	60.14 .14	10.9 0.2	26.72 .21	42.0 1.3	7.52 .40	79.0 1.6	49.17 .13	54.0 0.3
Apr. 10.3	59.99 .15	11.2 0.3	26.49 .23	43.2 1.0	7.10 .43	80.4 1.2	49.03 .14	54.4 0.4
20.3	59.85 .15	11.6 0.4	26.26 .23	44.0 0.7	6.66 .45	81.4 0.7	48.89 .14	54.8 0.5
30.3	59.70 .14	12.0 0.5	26.02 .23	44.5 +0.3	6.21 .45	81.9 +0.2	48.75 .14	55.3 0.5
May 10.2	59.57 .12	12.5 0.5	25.82 .21	44.7 0.0	5.77 .42	81.8 -0.3	48.61 .13	55.8 0.5
20.2	59.46 .10	13.1 0.6	25.60 .18	44.5 -0.3	5.36 .38	81.3 0.7	48.50 .11	56.4 0.5
30.2	59.36 .08	13.7 0.6	25.44 .15	44.0 0.7	5.00 .32	80.4 1.2	48.40 .09	56.9 0.5
June 9.1	59.30 .05	14.3 0.6	25.31 .11	43.2 1.0	4.71 .26	79.0 1.6	48.32 .06	57.3 0.5
19.1	59.26 -.02	14.9 0.6	25.22 .06	42.1 1.2	4.48 .19	77.2 1.9	48.28 .03	57.8 0.4
29.1	59.26 +.01	15.6 0.6	25.18 -.02	40.7 1.5	4.33 .11	75.1 2.2	48.25 -.01	58.2 0.4
July 9.1	59.28 .04	16.2 0.6	25.19 +.03	39.2 1.6	4.26 -.03	72.7 2.5	48.26 +.02	58.6 0.3
19.0	59.33 .07	16.8 0.6	25.24 .08	37.4 1.8	4.27 +.05	70.1 2.7	48.30 .05	58.9 0.3
29.0	59.41 .10	17.4 0.5	25.34 .12	35.5 1.9	4.37 .14	67.4 2.8	48.36 .08	59.2 0.2
Aug. 8.0	59.52 .12	17.8 0.4	25.48 .16	33.6 2.0	4.54 .22	64.5 2.9	48.45 .11	59.3 +0.1
18.0	59.66 .15	18.1 0.2	25.66 .21	31.5 2.1	4.80 .30	61.6 2.9	48.57 .13	59.3 -0.1
27.9	59.82 .18	18.3 +0.1	25.89 .25	29.5 2.1	5.14 .37	58.8 2.8	48.72 .16	59.2 0.2
Sept. 6.9	60.01 .20	18.2 -0.1	26.16 .29	27.3 2.1	5.55 .45	56.0 2.7	48.90 .19	58.8 0.4
16.9	60.23 .23	18.0 0.4	26.47 .33	25.3 2.0	6.04 .52	53.3 2.6	49.10 .22	58.3 0.6
26.8	60.47 .25	17.5 0.6	26.81 .36	23.3 1.9	6.58 .58	50.8 2.4	49.34 .25	57.6 0.8
Oct. 6.8	60.74 .28	16.8 0.8	27.19 .39	21.4 1.8	7.19 .63	48.5 2.1	49.59 .27	56.7 1.0
16.8	61.02 .30	15.9 1.0	27.60 .42	19.7 1.6	7.85 .68	46.5 1.8	49.88 .29	55.6 1.2
26.8	61.33 .31	14.7 1.2	28.03 .44	18.1 1.4	8.56 .72	44.9 1.4	50.18 .31	54.3 1.4
Nov. 5.7	61.65 .32	13.4 1.4	28.48 .46	16.8 1.2	9.29 .74	43.6 1.0	50.50 .32	52.9 1.5
15.7	61.97 .32	11.9 1.6	28.95 .46	15.8 0.9	10.04 .75	42.8 0.6	50.83 .32	51.3 1.6
25.7	62.29 .32	10.3 1.6	29.41 .46	15.1 0.5	10.78 .74	42.5 -0.1	51.16 .32	49.7 1.6
Dec. 5.7	62.61 .30	8.6 1.6	29.86 .44	14.7 -0.2	11.51 .71	42.7 +0.4	51.49 .30	48.1 1.6
15.6	62.90 .28	7.0 1.6	30.29 .41	14.8 +0.2	12.19 .68	43.3 0.9	51.80 .30	46.5 1.5
25.6	63.17 .25	5.4 1.5	30.68 .37	15.1 0.6	12.82 .58	44.4 1.4	52.09 .27	45.1 1.4
35.6	63.40 +.21	4.0 -1.3	31.02 +.32	15.9 +0.9	13.36 +.49	46.0 +1.7	52.34 +.23	43.8 -1.2

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	α Argus.		*1 Draconis (H.)		α Hydræ.		*d Ursæ Majoris.	
	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination South. °	Right Ascension.	Declination North.
	<sup>h</sup> 9 <sup>m</sup> 13	<sup>°</sup> 58 <sup>'</sup> 44	<sup>h</sup> 9 <sup>m</sup> 18	<sup>°</sup> 81 <sup>'</sup> 52	<sup>h</sup> 9 <sup>m</sup> 21	<sup>°</sup> 8 <sup>'</sup> 6	<sup>h</sup> 9 <sup>m</sup> 23	<sup>°</sup> 70 <sup>'</sup> 23
Jan. 1.6	41.20 +.30	1.4 +3.5	43.46+1.34	72.4 +2.0	17.94 +.25	11.3 +2.3	8.73 +.84	18.7 +1.5
11.6	41.46 .22	5.0 3.7	44.69 1.11	74.6 2.4	18.17 .20	13.6 2.1	9.31 .53	20.5 1.9
21.6	41.64 .14	8.7 3.8	45.66 .83	77.2 2.7	18.35 .16	15.6 2.0	9.79 .41	22.6 2.3
31.5	41.74 +.06	12.5 3.7	46.34 .52	80.0 3.0	18.48 .11	17.5 1.8	10.13 .28	25.1 2.6
Feb. 10.5	41.76 -.02	16.2 3.6	46.70 +.21	83.1 3.1	18.57 .06	19.3 1.6	10.34 +.14	27.8 2.7
20.5	41.69 .10	19.8 3.4	46.75 -.10	86.2 3.1	18.60 +.01	20.7 1.3	10.41 .00	30.6 2.8
Mar. 1.4	41.55 .17	23.1 3.1	46.49 .41	89.2 2.9	18.59 -.03	22.0 1.1	10.35 -.19	33.3 2.7
11.4	41.35 .23	26.0 2.8	45.95 .67	92.0 2.7	18.54 .07	22.9 0.8	10.16 .24	36.0 2.5
21.4	41.09 .28	28.7 2.4	45.15 .80	94.6 2.3	18.46 .10	23.6 0.6	9.87 .34	38.4 2.2
31.4	40.78 .32	30.9 2.0	44.14 1.09	96.7 1.9	18.34 .19	24.1 0.3	9.49 .42	40.5 1.9
Apr. 10.3	40.45 .35	32.6 1.5	42.97 1.23	98.4 1.4	18.21 .13	24.3 +0.1	9.03 .47	42.2 1.5
20.3	40.09 .36	33.9 1.0	41.70 1.31	99.5 0.9	18.08 .14	24.3 -0.1	8.54 .50	43.4 1.0
30.3	39.72 .37	34.6 +0.5	40.37 1.33	100.1 +0.3	17.93 .14	24.1 0.3	8.03 .51	44.2 +0.5
May 10.3	39.35 .36	34.8 0.0	39.04 1.31	100.1 -0.3	17.80 .13	23.7 0.5	7.52 .50	44.4 0.0
20.2	38.99 .35	34.6 -0.5	37.77 1.23	99.6 0.8	17.67 .12	23.1 0.7	7.03 .47	44.1 -0.5
30.2	38.65 .32	33.8 1.0	36.59 1.12	98.5 1.2	17.56 .10	22.3 0.8	6.58 .42	43.4 1.0
June 9.2	38.34 .29	32.5 1.5	35.54 .97	96.9 1.7	17.47 .08	21.4 1.0	6.19 .35	42.1 1.5
19.1	38.07 .25	30.8 1.9	34.66 .79	94.8 2.3	17.40 .06	20.4 1.1	5.88 .28	40.5 1.9
29.1	37.84 .21	28.7 2.3	33.97 .58	92.3 2.6	17.35 .03	19.2 1.2	5.63 .20	38.4 2.2
July 9.1	37.66 .16	26.2 2.6	33.50 .37	89.6 2.9	17.33 -.01	18.0 1.2	5.48 .11	36.1 2.5
19.1	37.53 .10	23.5 2.8	33.24 -.14	86.5 3.1	17.34 +.02	16.8 1.2	5.42 -.02	33.4 2.7
29.0	37.46 -.04	20.5 3.0	33.22 +.09	83.3 3.3	17.37 .05	15.6 1.2	5.44 +.07	30.6 2.9
Aug. 8.0	37.45 +.03	17.5 3.0	33.43 .32	80.0 3.4	17.43 .07	14.4 1.1	5.56 .16	27.6 3.0
18.0	37.51 .09	14.5 3.0	33.87 .55	76.6 3.4	17.52 .10	13.3 1.0	5.77 .26	24.5 3.1
28.0	37.64 .16	11.5 2.8	34.53 .77	73.2 3.3	17.64 .13	12.4 0.8	6.08 .35	21.4 3.1
Sept. 6.9	37.84 .23	8.8 2.6	35.41 .98	70.0 3.2	17.78 .16	11.7 0.6	6.47 .43	18.4 3.0
16.9	38.09 .29	6.4 2.2	36.49 1.18	66.9 3.0	17.96 .19	11.3 -0.3	6.94 .52	15.4 2.9
26.9	38.42 .35	4.4 1.7	37.76 1.36	64.0 2.7	18.17 .22	11.1 0.0	7.50 .59	12.6 2.7
Oct. 6.8	38.79 .40	2.9 1.2	39.20 1.52	61.4 2.4	18.41 .25	11.4 +0.4	8.13 .66	10.0 2.4
16.8	39.22 .44	2.0 -0.6	40.79 1.65	59.1 2.0	18.67 .28	11.9 0.7	8.83 .73	7.7 2.1
26.8	39.68 .47	1.8 0.0	42.50 1.76	57.3 1.6	18.96 .30	12.9 1.1	9.58 .77	5.7 1.8
Nov. 5.8	40.17 .49	2.1 +0.7	44.30 1.83	55.9 1.1	19.27 .31	14.1 1.4	10.37 .81	4.1 1.3
15.7	40.67 .49	3.1 1.3	46.14 1.85	55.0 -0.6	19.59 .32	15.7 1.7	11.20 .83	3.0 0.9
25.7	41.16 .48	4.8 1.9	48.00 1.83	54.8 0.0	19.91 .32	17.6 2.0	12.03 .83	2.4 -0.4
Dec. 5.7	41.62 .45	7.0 2.5	49.81 1.76	55.0 +0.5	20.23 .31	19.6 2.1	12.86 .80	2.3 +0.2
15.7	42.05 .40	9.7 2.9	51.52 1.65	55.9 1.1	20.54 .30	21.8 2.2	13.64 .76	2.7 0.7
25.6	42.43 .34	12.9 3.3	53.10 1.48	57.2 1.6	20.83 .27	24.1 2.3	14.38 .69	3.6 1.2
35.6	42.74 +.27	16.4 +3.6	54.49+1.25	59.1 +2.2	21.08 +.23	26.4 +2.2	15.02 +.60	5.0 +1.7

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\theta$ Ursæ Majoris.			$\epsilon$ Leonis.			$\mu$ Leonis.			$\alpha$ Leonis. (Regulus.)		
	Right Ascension.	Declination North.		Right Ascension.	Declination North.		Right Ascension.	Declination North.		Right Ascension.	Declination North.	
	<sup>h</sup> 9	<sup>m</sup> 24	<sup>°</sup> 52 15'	<sup>h</sup> 9	<sup>m</sup> 38	<sup>°</sup> 24 21'	<sup>h</sup> 9	<sup>m</sup> 45	<sup>°</sup> 26 36'	<sup>h</sup> 10	<sup>m</sup> 1	<sup>°</sup> 12 35'
Jan. 1.6	17.35	+39	27.0 +0.7	34.95	+39	43.9 -0.8	28.74	+31	29.4 -0.7	33.11	+29	32.8 -1.5
11.6	17.71	.33	27.9 1.1	35.22	.25	43.2 0.5	29.03	.26	28.8 0.4	33.38	.25	31.5 1.2
21.6	18.00	.26	29.2 1.5	35.45	.21	42.9 -0.2	29.27	.21	28.6 -0.1	33.61	.21	30.4 1.0
31.6	18.22	.18	30.8 1.7	35.63	.15	42.8 +0.1	29.46	.16	28.6 +0.2	33.80	.16	29.6 0.7
Feb. 10.5	18.37	.10	32.6 1.9	35.76	.10	43.1 0.3	29.59	.11	29.0 0.5	33.94	.11	29.0 0.4
20.5	18.43	+03	34.7 2.1	35.83	+04	43.5 0.6	29.67	+05	29.6 0.7	34.03	.06	28.7 -0.2
Mar. 1.5	18.42	-05	36.8 2.1	35.85	.00	44.2 0.7	29.70	.00	30.4 0.9	34.07	+02	28.6 0.0
11.4	18.34	.11	38.9 2.0	35.82	-05	45.0 0.8	29.68	-04	31.3 1.0	34.06	-02	28.8 +0.2
21.4	18.20	.16	40.8 1.9	35.75	.09	45.9 0.9	29.61	.06	32.3 1.0	34.02	.06	29.1 0.4
31.4	18.01	.21	42.6 1.6	35.65	.11	46.9 0.9	29.51	.11	33.4 1.0	33.94	.09	29.6 0.5
Apr. 10.4	17.78	.23	44.1 1.3	35.52	.13	47.8 0.9	29.39	.13	34.4 1.0	33.84	.11	30.1 0.6
20.3	17.54	.25	45.3 1.0	35.38	.14	48.6 0.8	29.25	.14	35.4 0.9	33.72	.12	30.7 0.6
30.3	17.29	.25	46.1 0.6	35.24	.14	49.4 0.7	29.10	.15	36.2 0.7	33.60	.12	31.3 0.6
May 10.3	17.04	.24	46.5 +0.2	35.10	.14	50.0 0.6	28.96	.14	36.9 0.6	33.47	.12	32.0 0.6
20.3	16.81	.22	46.6 -0.1	34.96	.13	50.5 0.4	28.82	.13	37.4 0.4	33.35	.12	32.6 0.6
30.2	16.60	.19	46.2 0.5	34.84	.11	50.9 0.3	28.69	.11	37.7 0.3	33.24	.10	33.1 0.5
June 9.2	16.42	.16	45.5 0.9	34.75	.09	51.1 +0.1	28.59	.09	37.9 +0.1	33.14	.09	33.7 0.5
19.2	16.29	.12	44.5 1.2	34.67	.06	51.1 0.0	28.51	.07	37.9 -0.1	33.06	.07	34.1 0.4
29.1	16.19	.07	43.1 1.5	34.62	.04	51.0 -0.2	28.45	.04	37.7 0.3	33.00	.06	34.4 0.3
July 9.1	16.14	-03	41.5 1.8	34.59	-01	50.7 0.3	28.42	-02	37.3 0.5	32.96	-03	34.7 0.2
19.1	16.14	+02	39.6 2.0	34.60	+02	50.3 0.5	28.42	+01	36.8 0.6	32.95	.00	34.9 +0.1
29.1	16.18	.07	37.5 2.2	34.63	.05	49.7 0.6	28.44	.04	36.1 0.8	32.96	+02	34.9 0.0
Aug. 8.0	16.28	.12	35.3 2.3	34.69	.08	49.0 0.8	28.50	.07	35.2 0.9	32.99	.05	34.9 -0.1
18.0	16.42	.16	32.9 2.4	34.79	.11	48.1 0.9	28.58	.10	34.2 1.1	33.05	.07	34.7 0.3
28.0	16.60	.21	30.5 2.5	34.91	.14	47.1 1.1	28.70	.13	33.0 1.2	33.14	.10	34.3 0.5
Sept. 7.0	16.83	.26	28.0 2.5	35.06	.17	45.9 1.2	28.85	.16	31.7 1.4	33.26	.13	33.7 0.7
16.9	17.11	.30	25.5 2.5	35.25	.20	44.6 1.4	29.03	.20	30.2 1.5	33.41	.17	33.0 0.9
26.9	17.44	.34	23.1 2.4	35.47	.23	43.2 1.5	29.24	.23	28.6 1.7	33.59	.20	32.0 1.1
Oct. 6.9	17.80	.38	20.8 2.3	35.71	.26	41.6 1.6	29.49	.26	26.9 1.7	33.81	.23	30.8 1.3
16.8	18.21	.42	18.6 2.1	35.99	.29	39.9 1.7	29.77	.29	25.2 1.8	34.05	.26	29.4 1.5
26.8	18.65	.45	16.6 1.8	36.30	.32	38.2 1.7	30.08	.29	23.3 1.8	34.33	.29	27.9 1.6
Nov. 5.8	19.11	.48	14.9 1.6	36.63	.34	36.4 1.7	30.41	.34	21.5 1.8	34.63	.31	26.2 1.8
15.8	19.60	.49	13.5 1.2	36.98	.35	34.7 1.7	30.76	.36	19.7 1.7	34.95	.33	24.4 1.8
25.7	20.09	.49	12.4 0.9	37.34	.36	33.0 1.6	31.13	.37	18.0 1.6	35.29	.34	22.5 1.9
Dec. 5.7	20.59	.48	11.7 -0.4	37.70	.36	31.5 1.4	31.49	.36	16.5 1.4	35.63	.34	20.6 1.8
15.7	21.06	.46	11.5 0.0	38.05	.34	30.2 1.2	31.85	.35	15.2 1.2	35.96	.33	18.8 1.7
25.7	21.50	.42	11.7 +0.4	38.38	.32	29.1 1.0	32.19	.32	14.1 0.9	36.29	.31	17.1 1.6
35.6	21.90	+37	12.3 +0.8	38.68	+28	28.2 -0.7	32.50	+29	13.3 -0.6	36.58	+28	15.6 -1.4



## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\eta$ Argus.		$\iota$ Leonis.		$\alpha$ Ursæ Majoris.		$\delta$ Leonis.	
	Right Ascension.	Declination South.	Right Ascension	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	<sup>h</sup> <sub>10</sub> <sup>m</sup> <sub>40</sub>	<sup>°</sup> <sub>59</sub> <sup>'</sup> <sub>0</sub>	<sup>h</sup> <sub>10</sub> <sup>m</sup> <sub>42</sub>	<sup>°</sup> <sub>11</sub> <sup>'</sup> <sub>13</sub>	<sup>h</sup> <sub>10</sub> <sup>m</sup> <sub>55</sub>	<sup>°</sup> <sub>62</sub> <sup>'</sup> <sub>25</sub>	<sup>h</sup> <sub>11</sub> <sup>m</sup> <sub>7</sub>	<sup>°</sup> <sub>21</sub> <sup>'</sup> <sub>13</sub>
Jan. 1.7	6.46 +.43	19.5 +2.9	31.33 +.81	21.2 -1.7	48.77 +.58	78.3 +0.1	17.54 +.34	27.7 -1.5
11.6	6.86 .37	22.6 3.9	31.63 .96	19.6 1.5	49.33 .53	78.7 0.6	17.66 .31	26.4 1.2
21.6	7.20 .31	26.0 3.5	31.89 .94	18.3 1.9	49.83 .47	79.6 1.9	18.15 .97	25.4 0.8
31.6	7.47 .39	29.6 3.7	32.12 .90	17.2 0.9	50.26 .39	81.0 1.7	18.41 .33	24.8 0.5
Feb. 10.6	7.67 .15	33.3 3.7	32.29 .15	16.4 0.6	50.61 .30	82.9 2.1	18.62 .19	24.5 -0.1
20.5	7.78 +.06	37.0 3.7	32.42 .10	16.0 0.3	50.86 .31	85.1 2.4	18.78 .14	24.5 +0.3
Mar. 1.5	7.82 .00	40.7 3.6	32.50 .06	15.8 -0.1	51.02 .10	87.6 2.6	18.90 .09	24.9 0.5
11.5	7.79 -0.07	44.2 3.4	32.54 +.09	15.8 +0.1	51.08 +.01	90.3 2.6	18.96 +.04	25.5 0.7
21.5	7.69 .13	47.5 3.1	32.53 -.09	16.1 0.3	51.05 -.07	92.9 2.6	18.98 .00	26.4 0.9
31.4	7.53 .19	50.4 2.8	32.49 .05	16.5 0.5	50.94 .15	95.5 2.5	18.96 -.03	27.3 1.0
Apr. 10.4	7.32 .33	53.1 2.4	32.42 .08	17.0 0.6	50.76 .39	97.9 2.3	18.91 .06	28.4 1.1
20.4	7.07 .37	55.3 2.0	32.33 .10	17.7 0.7	50.52 .36	100.0 1.9	18.83 .09	29.5 1.1
30.3	6.79 .39	57.1 1.6	32.23 .11	18.3 0.7	50.24 .30	101.8 1.6	18.73 .10	30.5 1.0
May 10.3	6.48 .31	58.4 1.1	32.12 .11	19.0 0.7	49.91 .32	103.2 1.1	18.62 .11	31.5 0.9
20.3	6.16 .39	59.2 0.6	32.01 .11	19.7 0.7	49.58 .33	104.1 0.7	18.51 .11	32.4 0.8
30.3	5.84 .39	59.6 +0.1	31.90 .11	20.3 0.6	49.25 .33	104.5 +0.2	18.39 .11	33.2 0.7
June 9.2	5.51 .39	59.4 -0.4	31.79 .10	20.9 0.5	48.93 .31	104.5 -0.3	18.28 .11	33.8 0.5
19.2	5.20 .30	58.8 0.9	31.70 .09	21.4 0.5	48.63 .39	104.0 0.7	18.18 .10	34.2 0.3
29.2	4.91 .36	57.6 1.3	31.62 .07	21.9 0.4	48.35 .35	103.0 1.3	18.08 .09	34.4 +0.1
July 9.2	4.63 .35	56.1 1.8	31.56 .05	22.2 0.3	48.12 .31	101.6 1.6	18.00 .07	34.5 -0.1
19.1	4.40 .31	54.1 2.2	31.51 .04	22.4 +0.2	47.92 .17	99.7 2.0	17.93 .06	34.3 0.2
29.1	4.21 .17	51.8 2.5	31.49 -0.01	22.5 0.0	47.78 .19	97.5 2.4	17.89 .04	34.0 0.5
Aug. 8.1	4.07 .19	49.2 2.7	31.48 +.01	22.5 -0.1	47.69 .06	95.0 2.7	17.86 -.01	33.4 0.7
18.0	3.98 -.05	46.5 2.8	31.50 .03	22.3 0.3	47.65 -.01	92.2 2.9	17.86 +.01	32.6 0.9
28.0	3.95 +.01	43.6 2.8	31.55 .06	21.9 0.5	47.68 +.06	89.2 3.1	17.88 .04	31.7 1.1
Sept. 7.0	4.00 .08	40.8 2.7	31.63 .09	21.4 0.7	47.77 .19	86.0 3.2	17.94 .07	30.5 1.3
17.0	4.11 .15	38.1 2.6	31.74 .12	20.6 0.9	47.92 .19	82.7 3.3	18.03 .10	29.1 1.5
26.9	4.31 .23	35.7 2.3	31.88 .16	19.6 1.1	48.14 .36	79.4 3.3	18.15 .14	27.5 1.7
Oct. 6.9	4.57 .30	33.5 1.9	32.06 .30	18.4 1.3	48.43 .33	76.1 3.3	18.31 .18	25.7 1.9
16.9	4.91 .37	31.8 1.4	32.27 .33	16.9 1.5	48.79 .39	72.8 3.1	18.51 .29	23.7 2.0
26.9	5.30 .49	30.7 0.9	32.52 .36	15.3 1.7	49.22 .46	69.8 2.9	18.74 .36	21.6 2.2
Nov. 5.8	5.75 .47	30.1 -0.3	32.80 .39	13.5 1.9	49.71 .51	67.0 2.6	19.02 .39	19.4 2.2
15.8	6.24 .50	30.1 +0.3	33.11 .39	11.6 2.0	50.24 .56	64.5 2.3	19.32 .39	17.2 2.2
25.8	6.75 .59	30.8 1.0	33.43 .33	9.5 2.0	50.82 .59	62.4 1.9	19.66 .34	14.9 2.2
Dec. 5.7	7.27 .59	32.0 1.6	33.77 .34	7.5 2.0	51.43 .61	60.8 1.4	20.01 .35	12.8 2.1
15.7	7.79 .50	33.9 2.1	34.12 .34	5.5 2.0	52.05 .69	59.6 0.9	20.37 .36	10.8 1.9
25.7	8.27 .46	36.3 2.6	34.45 .33	3.6 1.8	52.67 .60	59.0 -0.3	20.72 .35	9.0 1.7
35.7	8.72 +.41	39.2 +3.0	34.77 +.30	1.9 -1.6	53.25 +.56	59.0 +0.3	21.06 +.33	7.4 -1.4

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\delta$ Crateris.		$\tau$ Leonis.		$\lambda$ Draconis.		$\nu$ Leonis.	
	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination South.
	<sup>h</sup> 11 <sup>m</sup> 12	<sup>°</sup> 14 <sup>'</sup> 4	<sup>h</sup> 11 <sup>m</sup> 21	<sup>°</sup> 3 <sup>'</sup> 33	<sup>h</sup> 11 <sup>m</sup> 23	<sup>°</sup> 70 <sup>'</sup> 1	<sup>h</sup> 11 <sup>m</sup> 30	<sup>°</sup> 0 <sup>'</sup> 6
Jan. 1.7	56.11 +.32	59.8 +2.4	20.76 +.32	43.6 -2.0	46.98 +.76	60.6 0.0	23.17 +.32	56.4 +2.1
11.7	56.42 .99	62.2 2.4	21.07 .30	41.7 1.9	47.73 .79	60.8 +0.6	23.49 .30	58.4 2.0
21.6	56.69 .96	64.6 2.3	21.36 .37	39.9 1.7	48.42 .85	61.7 1.9	23.77 .37	60.4 1.8
31.6	56.93 .91	66.9 2.2	21.60 .23	38.3 1.4	49.03 .56	63.2 1.7	24.02 .23	62.1 1.6
Feb. 10.6	57.12 .17	69.1 2.1	21.81 .18	37.0 1.2	49.54 .45	65.1 2.1	24.24 .19	63.6 1.4
20.6	57.27 .13	71.1 1.9	21.97 .14	36.0 0.9	49.93 .33	67.4 2.5	24.40 .15	64.8 1.1
Mar. 1.5	57.37 .08	72.8 1.7	22.09 .09	35.3 0.6	50.19 .20	70.1 2.7	24.53 .10	65.8 0.8
11.5	57.43 +.04	74.4 1.4	22.16 .05	34.8 0.4	50.33 +.08	72.9 2.9	24.61 .06	66.5 0.6
21.5	57.45 .00	75.7 1.1	22.19 +.01	34.6 -0.1	50.35 -0.4	75.8 2.9	24.65 +.02	67.0 0.3
31.5	57.43 -.03	76.7 0.9	22.19 -.02	34.6 +0.1	50.24 .16	78.7 2.8	24.66 -.01	67.2 +0.1
Apr. 10.4	57.39 .06	77.4 0.7	22.16 .05	34.7 0.2	50.04 .25	81.3 2.6	24.63 .04	67.2 -0.1
20.4	57.32 .08	78.0 0.4	22.10 .07	35.1 0.4	49.74 .33	83.8 2.2	24.58 .06	67.1 0.2
30.4	57.23 .09	78.3 +0.2	22.02 .08	35.5 0.5	49.37 .40	85.8 1.9	24.51 .08	66.5 0.4
May 10.3	57.13 .10	78.4 0.0	21.93 .09	36.0 0.6	48.94 .44	87.5 1.4	24.43 .09	66.4 0.5
20.3	57.03 .11	78.2 -0.2	21.84 .10	36.6 0.6	48.48 .47	88.7 0.9	24.34 .09	65.9 0.5
30.3	56.91 .11	77.9 0.4	21.73 .10	37.2 0.6	48.00 .48	89.3 +0.4	24.24 .10	65.3 0.6
June 9.3	56.80 .11	77.4 0.6	21.64 .10	37.9 0.6	47.52 .48	89.5 -0.1	24.14 .10	64.7 0.6
19.2	56.70 .10	76.7 0.7	21.54 .09	38.5 0.6	47.05 .45	89.1 0.6	24.04 .09	64.1 0.6
29.2	56.60 .09	75.9 0.9	21.45 .09	39.1 0.6	46.61 .42	88.2 1.1	23.95 .09	63.5 0.6
July 9.2	56.51 .08	74.9 1.0	21.37 .08	39.7 0.5	46.21 .38	86.8 1.6	23.87 .08	62.8 0.6
19.2	56.43 .07	73.9 1.1	21.30 .06	40.2 0.5	45.85 .32	85.0 2.1	23.79 .07	62.2 0.6
29.1	56.37 .05	72.7 1.1	21.24 .05	40.6 0.4	45.56 .26	82.7 2.4	23.73 .05	61.7 0.5
Aug. 8.1	56.33 .03	71.6 1.1	21.21 -.03	40.9 0.3	45.33 .19	80.1 2.8	23.68 .04	61.2 0.4
18.1	56.31 -.01	70.5 1.1	21.19 .00	41.1 +0.1	45.18 .11	77.1 3.1	23.66 -.01	60.8 0.3
28.0	56.31 +.02	69.5 0.9	21.20 +.02	41.1 -0.1	45.10 -.03	73.9 3.3	23.65 +.01	60.6 -0.1
Sept. 7.0	56.35 .05	68.6 0.8	21.23 .05	41.0 0.3	45.11 +.05	70.5 3.5	23.68 .04	60.5 0.0
17.0	56.42 .09	67.9 0.6	21.30 .08	40.6 0.5	45.21 .15	66.9 3.6	23.74 .07	60.7 +0.3
27.0	56.53 .13	67.5 -0.3	21.40 .12	40.0 0.7	45.41 .24	63.3 3.6	23.83 .11	61.1 0.5
Oct. 6.9	56.67 .17	67.3 0.0	21.54 .16	39.2 1.0	45.69 .34	59.7 3.6	23.96 .15	61.7 0.8
16.9	56.86 .21	67.5 +0.3	21.71 .20	38.0 1.2	46.08 .43	56.2 3.4	24.12 .19	62.6 1.0
26.9	57.09 .24	68.0 0.7	21.93 .23	36.7 1.5	46.55 .52	52.8 3.2	24.33 .23	63.8 1.3
Nov. 5.8	57.35 .28	68.8 1.1	22.18 .27	35.1 1.7	47.12 .60	49.7 2.9	24.58 .26	65.2 1.6
15.8	57.64 .31	70.1 1.4	22.46 .30	33.3 1.9	47.76 .68	46.9 2.6	24.85 .29	66.9 1.8
25.8	57.96 .33	71.7 1.7	22.77 .32	31.3 2.0	48.47 .73	44.5 2.1	25.16 .32	68.8 2.0
Dec. 5.8	58.30 .34	73.5 2.0	23.10 .33	29.2 2.1	49.23 .77	42.6 1.6	25.49 .33	70.9 2.1
15.7	58.64 .34	75.6 2.2	23.44 .34	27.0 2.2	50.01 .79	41.3 1.0	25.82 .34	73.1 2.2
25.7	58.98 .33	77.9 2.3	23.78 .33	24.9 2.1	50.81 .78	40.6 -0.4	26.16 .33	75.3 2.2
35.7	59.30 +.31	80.3 +2.4	24.11 +.31	22.8 -2.0	51.58 +.76	40.4 +0.2	26.49 +.32	77.4 +2.1

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\beta$ Leonis.			$\gamma$ Ursæ Majoris.			$\epsilon$ Virginis.			*4 Draconis (H.)		
	Right Ascension.	Declination North.		Right Ascension.	Declination North.		Right Ascension.	Declination North.		Right Ascension.	Declination North.	
	<sup>h</sup> <sup>m</sup> 11 42	<sup>°</sup> <sup>'</sup> 15 16		<sup>h</sup> <sup>m</sup> 11 47	<sup>°</sup> <sup>'</sup> 54 23		<sup>h</sup> <sup>m</sup> 11 58	<sup>°</sup> <sup>'</sup> 9 26		<sup>h</sup> <sup>m</sup> 12 6	<sup>°</sup> <sup>'</sup> 78 19	
Jan. 1.7	31.15 +34	75.9 -1.8		4.91 +50	72.5 -0.8		40.61 +33	40.7 -2.0		11.11 +1.94	24.2 -0.4	
11.7	31.48 .32	74.2 1.5		5.40 .47	72.0 -0.2		40.94 .32	38.8 1.8		12.33 1.20	24.1 +0.2	
21.7	31.78 .29	72.8 1.2		5.86 .44	72.0 +0.3		41.94 .29	37.2 1.5		13.50 1.12	24.7 0.9	
31.6	32.05 .25	71.7 0.9		6.27 .38	72.6 0.9		41.52 .26	35.8 1.2		14.57 1.00	25.9 1.5	
Feb. 10.6	32.29 .21	71.0 0.6		6.63 .32	73.8 1.4		41.76 .22	34.7 0.9		15.50 .85	27.6 2.0	
20.6	32.48 .16	70.6 -0.2		6.92 .25	75.4 1.8		41.96 .18	33.9 0.6		16.28 .68	29.9 2.4	
Mar. 1.6	32.62 .12	70.5 +0.1		7.13 .18	77.3 2.1		42.12 .13	33.5 -0.3		16.86 .49	32.5 2.8	
11.5	32.72 .08	70.7 0.3		7.28 .11	79.6 2.4		42.23 .09	33.3 0.0		17.25 .28	35.4 3.0	
21.5	32.77 +0.4	71.2 0.6		7.34 +0.4	82.0 2.5		42.30 .05	33.4 +0.2		17.43 +0.6	38.4 3.1	
31.5	32.79 .00	71.9 0.8		7.35 -0.3	84.5 2.5		42.33 +0.2	33.8 0.4		17.40 -1.2	41.5 3.0	
Apr. 10.4	32.77 -0.3	72.7 0.9		7.28 .09	87.0 2.4		42.33 -0.1	34.3 0.6		17.18 .31	44.5 2.9	
20.4	32.72 .06	73.6 0.9		7.17 .14	89.4 2.2		42.30 .04	35.0 0.7		16.79 .47	47.2 2.6	
30.4	32.66 .08	74.6 1.0		7.01 .18	91.5 2.0		42.25 .06	35.7 0.8		16.24 .61	49.6 2.2	
May 10.4	32.57 .09	75.5 0.9		6.81 .21	93.4 1.7		42.18 .08	36.5 0.8		15.56 .72	51.7 1.8	
20.3	32.48 .10	76.4 0.9		6.60 .23	94.9 1.3		42.10 .09	37.3 0.8		14.79 .81	53.3 1.3	
30.3	32.38 .10	77.3 0.8		6.36 .24	96.0 0.9		42.01 .09	38.1 0.7		13.95 .86	54.3 0.8	
June 9.3	32.27 .10	78.0 0.7		6.12 .24	96.6 +0.4		41.92 .10	38.8 0.7		13.06 .89	54.9 +0.2	
19.3	32.17 .10	78.6 0.5		5.89 .23	96.8 0.0		41.82 .10	39.5 0.6		12.16 .89	54.8 -0.3	
29.2	32.07 .10	79.1 0.4		5.66 .22	96.6 -0.5		41.72 .10	40.0 0.5		11.28 .87	54.2 0.9	
July 9.2	31.98 .09	79.4 +0.2		5.44 .20	95.8 0.9		41.63 .09	40.5 0.4		10.43 .82	53.1 1.4	
19.2	31.89 .08	79.5 0.0		5.25 .18	94.7 1.3		41.54 .08	40.8 0.3		9.64 .75	51.5 1.9	
29.1	31.82 .06	79.5 -0.1		5.08 .15	93.2 1.7		41.46 .07	41.0 +0.1		8.92 .67	49.4 2.3	
Aug. 8.1	31.77 .04	79.2 0.3		4.95 .12	91.2 2.1		41.39 .06	41.1 0.0		8.30 .56	46.9 2.7	
18.1	31.73 -0.2	78.8 0.5		4.85 .08	89.0 2.4		41.35 .04	41.0 -0.2		7.79 .45	43.9 3.1	
28.1	31.72 .00	78.2 0.7		4.79 -0.4	86.4 2.7		41.32 -0.1	40.6 0.4		7.41 .32	40.7 3.4	
Sept. 7.0	31.73 +0.3	77.3 1.0		4.78 +0.1	83.5 2.9		41.32 +0.1	40.1 0.6		7.15 .18	37.2 3.6	
17.0	31.78 .08	76.2 1.2		4.81 .07	80.5 3.1		41.35 .05	39.4 0.9		7.05 -0.2	33.5 3.7	
27.0	31.86 .10	74.9 1.4		4.91 .12	77.3 3.3		41.41 .08	38.4 1.1		7.10 +1.3	29.7 3.8	
Oct. 7.0	31.98 .14	73.4 1.6		5.06 .18	73.9 3.3		41.51 .12	37.2 1.3		7.32 .29	25.8 3.8	
16.9	32.14 .18	71.6 1.8		5.27 .24	70.6 3.3		41.65 .16	35.8 1.6		7.69 .46	22.0 3.7	
26.9	32.33 .22	69.7 2.0		5.54 .30	67.3 3.3		41.83 .20	34.1 1.8		8.24 .62	18.3 3.6	
Nov. 5.9	32.57 .26	67.6 2.2		5.88 .36	64.0 3.1		42.06 .24	32.2 2.0		8.94 .78	14.9 3.3	
15.8	32.85 .29	65.3 2.3		6.26 .41	61.0 2.9		42.32 .28	30.1 2.1		9.79 .92	11.7 3.0	
25.8	33.16 .32	63.1 2.3		6.70 .45	58.3 2.6		42.61 .31	27.9 2.2		10.78 1.04	8.9 2.5	
Dec. 5.8	33.49 .34	60.8 2.2		7.17 .49	55.9 2.2		42.94 .33	25.7 2.2		11.88 1.14	6.6 2.0	
15.8	33.83 .35	58.6 2.2		7.67 .50	54.0 1.7		43.27 .34	23.4 2.2		13.06 1.20	4.8 1.5	
25.7	34.18 .34	56.5 2.0		8.18 .51	52.5 1.2		43.61 .34	21.3 2.1		14.29 1.23	3.7 0.8	
35.7	34.52 +33	54.6 -1.7		8.68 +50	51.6 -0.6		43.95 +33	19.2 -1.9		15.52 +1.23	3.2 -0.2	



## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\beta$ Chamæleontis.		$\eta$ Virginis.		$\alpha^1$ Crucis.		$\beta$ Corvi.	
	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination South.
	<sup>h</sup> 12 <sup>m</sup> 10	<sup>°</sup> 78 <sup>'</sup> 35	<sup>h</sup> 12 <sup>m</sup> 13	<sup>°</sup> 0 <sup>'</sup> 2	<sup>h</sup> 12 <sup>m</sup> 19	<sup>°</sup> 62 <sup>'</sup> 22	<sup>h</sup> 12 <sup>m</sup> 27	<sup>°</sup> 22 <sup>'</sup> 41
Jan. 1.7	52.09+1.18	40.1 +1.6	20.65 +.32	46.5 -2.2	28.32 +.58	54.4 +1.8	39.06 +.35	4.6 +2.2
11.7	53.24 1.11	42.0 2.1	20.98 .32	44.4 2.0	28.88 .54	56.5 2.3	39.41 .34	6.9 2.3
21.7	54.30 .99	44.4 2.6	21.29 .29	42.4 1.9	29.40 .50	59.0 2.7	39.73 .31	9.2 2.4
31.6	55.24 .87	47.2 3.0	21.57 .26	40.6 1.7	29.88 .44	61.9 3.0	40.03 .28	11.6 2.4
Feb. 10.6	56.05 .73	50.5 3.4	21.81 .23	39.1 1.4	30.29 .38	65.0 3.3	40.30 .24	14.0 2.3
20.6	56.70 .57	54.0 3.6	22.02 .19	37.8 1.1	30.63 .30	68.4 3.5	40.52 .20	16.3 2.2
Mar. 1.6	57.18 .40	57.7 3.8	22.19 .15	36.8 0.9	30.89 .23	72.0 3.5	40.71 .16	18.5 2.1
11.5	57.50 .23	61.6 3.8	22.31 .10	36.0 0.6	31.09 .16	75.5 3.5	40.85 .12	20.5 1.9
21.5	57.64 +.06	65.4 3.8	22.40 .07	35.6 0.3	31.21 .08	79.1 3.5	40.95 .08	22.4 1.7
31.5	57.62 -1.10	69.2 3.7	22.44 +.02	35.3 -0.1	31.25 +.01	82.5 3.3	41.01 .05	23.9 1.5
Apr. 10.4	57.44 .25	72.9 3.5	22.46 .00	35.3 +0.1	31.23 -.05	85.7 3.1	41.04 +.01	25.3 1.3
20.4	57.11 .40	76.3 3.3	22.45 -.02	35.5 0.2	31.15 .11	88.8 2.9	41.04 -.01	26.5 1.0
30.4	56.64 .53	79.5 3.0	22.41 .04	35.8 0.4	31.01 .16	91.5 2.6	41.02 .04	27.4 0.8
May 10.4	56.05 .65	82.3 2.6	22.36 .06	36.2 0.5	30.82 .21	93.9 2.2	40.96 .06	28.0 0.5
20.3	55.34 .76	84.7 2.2	22.29 .08	36.7 0.5	30.59 .25	95.9 1.8	40.89 .08	28.5 0.3
30.3	54.54 .84	86.7 1.7	22.21 .09	37.3 0.6	30.31 .29	97.4 1.3	40.81 .09	28.7 +0.1
June 9.3	53.66 .90	88.2 1.2	22.12 .09	37.9 0.6	30.01 .31	98.6 0.9	40.71 .10	28.6 -0.1
19.3	52.73 .95	89.1 0.7	22.02 .09	38.5 0.6	29.68 .33	99.2 +0.4	40.60 .11	28.4 0.3
29.2	51.77 .96	89.5 +0.1	21.93 .10	39.2 0.6	29.34 .34	99.3 -0.1	40.49 .12	28.0 0.5
July 9.2	50.80 .96	89.3 -0.4	21.83 .09	39.7 0.6	28.99 .35	99.0 0.6	40.37 .12	27.3 0.7
19.2	49.85 .92	88.6 1.0	21.74 .09	40.3 0.5	28.65 .34	98.2 1.0	40.26 .12	26.5 0.9
29.1	48.96 .85	87.4 1.5	21.65 .08	40.8 0.5	28.32 .31	96.9 1.5	40.14 .11	25.5 1.0
Aug. 8.1	48.15 .75	85.7 1.9	21.58 .07	41.2 0.4	28.02 .28	95.2 1.9	40.04 .09	24.5 1.1
18.1	47.45 .63	83.5 2.3	21.52 .05	41.5 0.2	27.76 .23	93.2 2.2	39.95 .08	23.3 1.2
28.1	46.89 .48	81.0 2.6	21.48 -.02	41.7 +0.1	27.56 .18	90.8 2.4	39.89 .05	22.1 1.2
Sept. 7.0	46.49 .31	78.3 2.9	21.46 .00	41.7 -0.1	27.41 .11	88.3 2.6	39.84 -.02	20.9 1.1
17.0	46.28 -.11	75.3 3.0	21.47 +.03	41.5 0.3	27.34 -.03	85.6 2.7	39.84 +.01	19.9 1.0
27.0	46.26 +.09	72.3 3.0	21.52 .07	41.1 0.5	27.35 +.06	82.9 2.6	39.87 .05	18.9 0.8
Oct. 7.0	46.46 .30	69.4 2.8	21.61 .11	40.4 0.8	27.46 .15	80.4 2.5	39.94 .10	18.2 0.6
16.9	46.86 .50	66.6 2.6	21.74 .15	39.5 1.0	27.65 .24	78.0 2.2	40.06 .14	17.8 -0.3
26.9	47.46 .69	64.1 2.3	21.91 .19	38.3 1.3	27.93 .33	76.0 1.8	40.23 .19	17.7 0.0
Nov. 5.9	48.25 .87	62.1 1.8	22.12 .22	36.9 1.6	28.30 .41	74.3 1.4	40.44 .24	17.9 +0.4
15.8	49.19 1.01	60.5 1.3	22.37 .27	35.2 1.8	28.74 .48	73.2 0.9	40.70 .28	18.5 0.8
25.8	50.26 1.12	59.5 0.7	22.65 .30	33.3 2.0	29.25 .53	72.6 -0.3	41.00 .31	19.4 1.2
Dec. 5.8	51.43 1.19	59.1 -0.1	22.96 .32	31.2 2.1	29.80 .57	72.6 +0.3	41.32 .34	20.8 1.5
15.8	52.64 1.22	59.3 +0.6	23.29 .33	29.1 2.2	30.39 .59	73.2 0.9	41.67 .35	22.4 1.8
25.7	53.86 1.21	60.2 1.2	23.63 .34	26.9 2.2	30.98 .59	74.4 1.5	42.02 .36	24.4 2.1
35.7	55.06+1.17	61.8 +1.8	23.97 +.33	24.7 -2.1	31.56 +.57	76.1 +2.0	42.38 +.35	26.5 +2.2

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	* $\kappa$ Draconis.		*32 Camelop. (H.)		12 Can. Venaticorum		$\theta$ Virginis.		
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination South.	
	<sup>h</sup> 12	<sup>m</sup> 27	<sup>h</sup> 12	<sup>m</sup> 48	<sup>h</sup> 12	<sup>m</sup> 50	<sup>h</sup> 13	<sup>m</sup> 3	
	<sup>s</sup> 12 27	<sup>s</sup> 70 29	<sup>s</sup> 12 48	<sup>s</sup> 84 5	<sup>s</sup> 12 50	<sup>s</sup> 39 0	<sup>s</sup> 13 3	<sup>s</sup> 4 51	
Jan. 1.8	60.09 +79	23.8 -0.9	12.92+2.96	75.6 -0.9	1.31 +4.0	28.9 -1.8	18.34 +34	11.3 +2.1	
11.7	60.88 .77	23.2 -0.3	15.21 2.96	75.0 -0.9	1.71 .39	27.3 1.4	18.68 .33	13.4 2.1	
21.7	61.64 .73	23.3 +0.4	17.48 2.21	75.1 +0.4	2.09 .39	26.2 0.9	19.00 .31	15.5 2.0	
31.7	62.35 .67	23.9 1.0	19.64 2.07	75.9 1.1	2.46 .35	25.6 -0.3	19.31 .29	17.4 1.8	
Feb. 10.6	62.98 .59	25.2 1.6	21.62 1.85	77.3 1.7	2.79 .31	25.5 +0.9	19.58 .26	19.1 1.6	
	20.6	63.52 .49	27.0 2.0	23.34 1.56	79.2 2.2	3.08 .26	26.0 0.7	19.83 .23	20.7 1.4
Mar. 1.6	63.95 .37	29.3 2.4	24.74 1.29	81.6 2.6	3.32 .29	26.9 1.1	20.04 .19	21.9 1.1	
11.6	64.27 .25	31.9 2.7	25.79 .85	84.4 2.9	3.51 .17	28.3 1.5	20.21 .15	23.0 0.9	
21.5	64.46 .13	34.8 2.9	26.44 .46	87.4 3.0	3.65 .12	30.0 1.8	20.35 .12	23.7 0.6	
31.5	64.53 +.01	37.6 3.0	26.70 +.06	90.5 3.1	3.74 .07	31.9 2.0	20.45 .06	24.3 0.4	
Apr. 10.5	64.47 -10	40.7 2.9	26.57 -3.3	93.5 3.0	3.79 +.02	34.0 2.1	20.51 .05	24.5 +0.2	
20.5	64.32 .20	43.5 2.7	26.05 .89	96.5 2.8	3.79 -.02	36.1 2.1	20.55 +.02	24.6 0.0	
30.4	64.06 .30	46.1 2.4	25.19 1.01	99.2 2.5	3.75 .05	38.3 2.1	20.56 .00	24.6 -0.1	
May 10.4	63.73 .37	48.4 2.1	24.02 1.30	101.6 2.2	3.68 .08	40.3 1.9	20.55 -.02	24.3 0.3	
20.4	63.32 .43	50.3 1.7	22.59 1.53	103.5 1.7	3.58 .11	42.1 1.7	20.51 .04	24.0 0.4	
	30.3	62.87 .47	51.7 1.2	20.96 1.71	105.0 1.2	3.46 .13	43.7 1.4	20.46 .06	23.6 0.4
June 9.3	62.39 .49	52.7 0.7	19.17 1.83	105.9 0.7	3.32 .14	45.0 1.1	20.39 .07	23.1 0.5	
19.3	61.88 .51	53.1 +0.1	17.29 1.90	106.3 +0.1	3.17 .15	46.0 0.8	20.31 .09	22.6 0.5	
29.3	61.38 .59	52.9 -0.4	15.37 1.92	106.2 -0.4	3.02 .16	46.6 +0.4	20.22 .10	22.0 0.6	
July 9.2	60.88 .49	52.3 0.9	13.46 1.88	105.5 1.0	2.86 .16	46.8 0.0	20.12 .10	21.5 0.6	
	19.2	60.41 .46	51.1 1.4	11.60 1.81	104.2 1.5	2.70 .16	46.6 -0.3	20.01 .11	20.9 0.6
29.2	59.97 .42	49.4 1.9	9.85 1.68	102.4 2.0	2.54 .15	46.1 0.7	19.91 .10	20.3 0.5	
Aug. 8.2	59.57 .36	47.3 2.3	8.23 1.52	100.2 2.5	2.40 .13	45.2 1.1	19.80 .10	19.8 0.5	
18.1	59.24 .30	44.8 2.7	6.80 1.33	97.5 2.9	2.28 .11	43.9 1.5	19.71 .09	19.4 0.4	
28.1	58.97 .23	41.9 3.1	5.58 1.10	94.5 3.2	2.17 .09	42.3 1.8	19.63 .07	19.0 0.3	
Sept. 7.1	58.77 .15	38.6 3.4	4.60 .84	91.1 3.5	2.09 .06	40.3 2.1	19.57 .05	18.8 -0.1	
17.0	58.66 -.07	35.1 3.6	3.89 .56	87.5 3.7	2.05 -.02	38.1 2.4	19.53 -.02	18.7 0.0	
27.0	58.64 +.03	31.5 3.7	3.47 -.26	83.7 3.9	2.05 +.02	35.5 2.7	19.53 +.02	18.9 +0.2	
Oct. 7.0	58.72 .13	27.7 3.8	3.37 +.06	79.8 3.9	2.08 .06	32.7 2.9	19.57 .06	19.2 0.5	
17.0	58.90 .24	23.9 3.8	3.59 .39	75.9 3.9	2.18 .12	29.7 3.0	19.64 .10	19.8 0.7	
	26.9	59.19 .34	20.1 3.7	4.14 .72	72.0 3.8	2.32 .17	26.6 3.1	19.77 .15	20.6 1.0
Nov. 5.9	59.59 .45	16.5 3.5	5.03 1.05	68.3 3.6	2.51 .22	23.5 3.2	19.94 .19	21.8 1.3	
15.9	60.08 .54	13.0 3.3	6.24 1.36	64.8 3.3	2.76 .27	20.3 3.1	20.15 .23	23.2 1.5	
25.9	60.67 .63	10.0 2.9	7.75 1.65	61.7 2.9	3.05 .31	17.2 3.0	20.41 .27	24.8 1.7	
Dec. 5.8	61.34 .70	7.3 2.4	9.53 1.89	59.0 2.4	3.39 .35	14.2 2.8	20.69 .30	26.6 1.9	
	15.8	62.07 .75	5.1 1.9	11.54 2.09	56.8 1.9	3.76 .38	11.6 2.5	21.01 .32	28.7 2.1
25.8	62.84 .78	3.4 1.3	13.70 2.22	55.2 1.3	4.14 .39	9.2 2.1	21.34 .33	30.8 2.1	
35.7	63.63 +.78	2.4 -0.7	15.97+2.30	54.3 -0.6	4.54 +.40	7.3 -1.7	21.68 +.34	32.9 +2.1	

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Virginis. (Spica.)		$\zeta$ Virginis.		$\eta$ Ursæ Majoris.		$\eta$ Bootis.	
	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	<sup>h</sup> 13 <sup>m</sup> 18	<sup>°</sup> 10 <sup>'</sup> 29	<sup>h</sup> 13 <sup>m</sup> 28	<sup>°</sup> 0 <sup>'</sup> 3	<sup>h</sup> 13 <sup>m</sup> 42	<sup>°</sup> 49 <sup>'</sup> 56	<sup>h</sup> 13 <sup>m</sup> 48	<sup>°</sup> 19 <sup>'</sup> 2
Jan. 1.8	<sup>s</sup> 25.89 +34	<sup>"</sup> 24.1 +2.1	<sup>s</sup> 9.07 +33	<sup>"</sup> 36.8 -2.2	<sup>s</sup> 28.49 +43	<sup>"</sup> 59.5 -2.2	<sup>s</sup> 34.13 +34	<sup>"</sup> 23.4 -2.3
11.8	26.23 .33	26.2 2.1	9.40 .33	36.6 2.1	28.93 .45	57.5 1.7	34.47 .34	21.2 2.1
21.7	26.56 .32	26.3 2.0	9.73 .32	34.6 1.9	29.38 .44	56.1 1.1	34.81 .34	19.3 1.7
31.7	26.87 .30	30.3 1.9	10.04 .30	32.8 1.7	29.82 .43	55.3 -0.5	35.14 .32	17.8 1.3
Feb. 10.7	27.16 .27	32.1 1.8	10.33 .28	31.2 1.5	30.23 .40	55.2 +0.1	35.45 .30	16.7 0.9
20.7	27.42 .24	33.9 1.6	10.60 .25	29.9 1.3	30.61 .36	55.6 0.7	35.74 .27	16.0 0.5
Mar. 1.6	27.64 .21	35.4 1.4	10.82 .21	28.8 0.9	30.94 .31	56.6 1.2	35.99 .24	15.7 -0.1
11.6	27.83 .17	36.7 1.2	11.02 .18	28.1 0.6	31.23 .25	58.1 1.7	36.21 .20	15.9 +0.3
21.6	27.98 .13	37.8 1.0	11.18 .14	27.6 0.3	31.45 .20	60.0 2.1	36.39 .16	16.4 0.7
31.5	28.10 .10	38.6 0.7	11.30 .11	27.4 -0.1	31.62 .14	62.3 2.4	36.54 .13	17.2 1.0
Apr. 10.5	28.18 .07	39.2 0.5	11.39 .07	27.4 +0.1	31.74 .08	64.8 2.6	36.65 .09	18.4 1.2
20.5	28.23 .04	39.7 0.3	11.45 .05	27.7 0.3	31.79 +0.03	67.4 2.6	36.72 .06	19.7 1.4
30.5	28.26 +0.01	39.9 +0.2	11.48 +0.02	28.0 0.4	31.80 -0.02	70.1 2.6	36.76 +0.03	21.1 1.5
May 10.4	28.26 -0.01	40.0 0.0	11.49 -0.01	28.5 0.6	31.75 .07	72.6 2.5	36.78 .00	22.6 1.5
20.4	28.24 .03	39.9 -0.1	11.47 .04	29.1 0.6	31.66 .11	75.0 2.3	36.76 -0.03	24.1 1.5
30.4	28.19 .05	39.8 0.2	11.43 .05	29.8 0.6	31.54 .14	77.2 2.0	36.73 .05	25.5 1.4
June 9.4	28.13 .07	39.5 0.3	11.38 .06	30.4 0.7	31.38 .17	79.0 1.6	36.67 .07	26.8 1.2
19.3	28.05 .08	39.1 0.4	11.30 .06	31.1 0.6	31.19 .20	80.5 1.2	36.59 .09	28.0 1.1
29.3	27.96 .10	38.6 0.5	11.22 .09	31.7 0.6	30.99 .21	81.5 0.8	36.49 .10	29.0 0.9
July 9.3	27.86 .10	38.1 0.5	11.12 .10	32.3 0.6	30.77 .23	82.1 +0.4	36.38 .12	29.7 0.6
19.2	27.75 .11	37.5 0.6	11.01 .11	32.9 0.5	30.53 .23	82.3 -0.1	36.26 .13	30.2 0.4
29.2	27.64 .11	36.9 0.6	10.90 .11	33.3 0.4	30.30 .23	81.9 0.5	36.13 .13	30.5 +0.1
Aug. 8.2	27.53 .11	36.3 0.6	10.79 .11	33.7 0.3	30.07 .23	81.2 1.0	36.00 .13	30.5 -0.1
18.2	27.42 .10	35.8 0.6	10.68 .10	34.0 0.2	29.85 .21	79.9 1.4	35.87 .12	30.2 0.4
28.1	27.33 .08	35.2 0.5	10.58 .09	34.1 +0.1	29.64 .19	78.3 1.9	35.75 .11	29.7 0.7
Sept 7.1	27.26 .06	34.7 0.4	10.50 .07	34.1 -0.1	29.46 .16	76.2 2.3	35.65 .09	28.8 1.0
17.1	27.20 -0.03	34.4 0.3	10.45 .04	33.9 0.3	29.32 .12	73.7 2.6	35.56 .07	27.8 1.3
27.1	27.19 .00	34.2 -0.1	10.42 -0.01	33.5 0.5	29.21 .08	70.9 2.9	35.51 -0.03	26.2 1.5
Oct. 7.0	27.21 +0.04	34.2 +0.1	10.43 +0.03	32.9 0.7	29.16 -0.03	67.8 3.2	35.49 .00	24.6 1.8
17.0	27.27 .09	34.4 0.4	10.48 .07	32.0 1.0	29.16 +0.03	64.5 3.4	35.52 +0.05	22.6 2.1
27.0	27.38 .13	34.9 0.6	10.58 .12	30.9 1.2	29.22 .10	61.0 3.6	35.58 .09	20.4 2.3
Nov. 5.9	27.54 .18	35.7 0.9	10.72 .17	29.5 1.5	29.35 .16	57.4 3.6	35.70 .14	18.0 2.5
15.9	27.75 .23	36.7 1.2	10.91 .21	27.9 1.7	29.55 .22	53.7 3.6	35.87 .19	15.5 2.6
25.9	27.99 .26	38.1 1.5	11.14 .25	26.1 1.9	29.80 .20	50.2 3.5	36.08 .23	12.8 2.7
Dec. 5.9	28.28 .30	39.7 1.7	11.41 .29	24.1 2.1	30.12 .34	46.8 3.2	36.34 .27	10.1 2.7
15.8	28.59 .32	41.5 1.9	11.72 .31	22.0 2.1	30.49 .39	43.7 2.9	36.63 .30	7.4 2.6
25.8	28.92 .34	43.4 2.0	12.04 .33	19.8 2.2	30.89 .42	40.9 2.5	36.95 .33	4.8 2.5
35.8	29.28 +2.24	45.5 +2.1	12.37 +3.33	17.6 -2.2	31.33 +4.44	38.6 -2.1	37.29 +3.24	2.4 -2.3

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\beta$ Centauri.		$\alpha$ Draconis.		$\alpha$ Bootis. (Arcturus.)		$\theta$ Bootis.	
	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension	Declination North.	Right Ascension.	Declination North.
	<sup>h</sup> 13 <sup>m</sup> 54	<sup>°</sup> 59 <sup>'</sup> 44	<sup>h</sup> 14 <sup>m</sup> 0	<sup>°</sup> 64 <sup>'</sup> 58	<sup>h</sup> 14 <sup>m</sup> 9	<sup>°</sup> 19 <sup>'</sup> 50	<sup>h</sup> 14 <sup>m</sup> 20	<sup>°</sup> 52 <sup>'</sup> 26
Jan. 1.8	46.29 +.56	53.8 +0.7	54.03 +.58	62.6 -2.2	47.98 +.33	57.7 -2.5	48.79 +.42	25.0 -2.6
11.8	46.85 .56	54.7 1.1	54.63 .61	60.7 1.6	48.32 .33	55.3 2.2	49.23 .44	22.6 2.1
21.8	47.42 .56	56.1 1.6	55.25 .62	59.4 1.0	48.65 .33	53.3 1.8	49.68 .45	20.9 1.5
31.7	47.96 .53	57.9 2.0	55.86 .61	58.7 -0.3	48.98 .32	51.6 1.4	50.13 .45	19.7 0.9
Feb. 10.7	48.48 .50	60.1 2.3	56.46 .57	58.7 +0.3	49.30 .30	50.4 1.0	50.58 .43	19.1 -0.2
20.7	48.95 .45	62.5 2.6	57.01 .53	59.3 1.0	49.59 .28	49.6 0.6	51.00 .40	19.2 +0.4
Mar. 1.7	49.38 .40	65.3 2.8	57.51 .46	60.6 1.5	49.86 .25	49.2 -0.1	51.38 .36	19.9 1.0
11.6	49.76 .34	68.2 3.0	57.94 .39	62.4 2.0	50.09 .22	49.3 +0.3	51.72 .31	21.2 1.5
21.6	50.07 .28	71.2 3.1	58.29 .30	64.7 2.4	50.29 .18	49.8 0.7	52.00 .26	23.0 2.0
31.6	50.32 .22	74.3 3.1	58.55 .22	67.3 2.7	50.46 .15	50.6 1.0	52.23 .20	25.2 2.3
Apr. 10.5	50.52 .16	77.4 3.0	58.72 .13	70.2 2.9	50.58 .11	51.7 1.2	52.40 .14	27.7 2.6
20.5	50.65 .11	80.4 2.9	58.80 +.04	73.1 3.0	50.68 .08	53.0 1.4	52.51 .08	30.4 2.7
30.5	50.73 +.05	83.3 2.8	58.80 -0.4	76.1 2.9	50.74 .05	54.5 1.5	52.56 +.03	33.1 2.8
May 10.5	50.75 -0.1	86.0 2.6	58.71 .12	79.0 2.8	50.77 +.02	56.0 1.6	52.56 -0.3	35.9 2.7
20.4	50.71 .07	88.5 2.3	58.55 .19	81.7 2.5	50.77 -0.1	57.6 1.5	52.51 .08	38.6 2.6
30.4	50.61 .12	90.7 2.0	58.32 .25	84.1 2.2	50.75 .04	59.1 1.4	52.41 .12	41.0 2.3
June 9.4	50.47 .17	92.6 1.7	58.04 .31	86.1 1.8	50.70 .06	60.5 1.3	52.27 .16	43.2 2.0
19.4	50.28 .21	94.1 1.3	57.71 .35	87.7 1.4	50.63 .08	61.7 1.2	52.09 .19	45.0 1.6
29.3	50.04 .25	95.2 0.9	57.34 .38	88.9 0.9	50.53 .10	62.8 0.9	51.88 .22	46.5 1.2
July 9.3	49.77 .28	96.0 +0.5	56.94 .40	89.5 +0.4	50.42 .12	63.6 0.7	51.65 .25	47.5 0.8
19.3	49.48 .31	96.2 0.0	56.53 .42	89.6 -0.1	50.30 .13	64.2 0.5	51.39 .26	48.0 +0.3
29.2	49.16 .32	96.0 -0.4	56.11 .42	89.2 0.7	50.17 .14	64.5 +0.2	51.12 .27	48.1 -0.2
Aug. 8.2	48.84 .32	95.4 0.8	55.69 .41	88.3 1.2	50.02 .14	64.5 -0.1	50.85 .27	47.6 0.7
18.2	48.53 .30	94.3 1.2	55.29 .39	86.9 1.7	49.88 .14	64.3 0.4	50.58 .27	46.7 1.1
28.2	48.24 .27	92.9 1.6	54.91 .36	84.9 2.1	49.75 .13	63.7 0.7	50.32 .25	45.3 1.6
Sept. 7.1	47.98 .23	91.1 1.9	54.56 .32	82.6 2.5	49.62 .11	62.9 1.0	50.08 .23	43.5 2.0
17.1	47.77 .18	89.1 2.1	54.27 .26	79.9 2.9	49.52 .09	61.8 1.3	49.87 .19	41.3 2.4
27.1	47.62 .11	86.8 2.3	54.04 .20	76.7 3.3	49.44 .06	60.3 1.6	49.69 .15	38.6 2.8
Oct. 7.1	47.55 -0.3	84.5 2.4	53.87 .12	73.3 3.5	49.40 -0.2	58.6 1.9	49.57 .10	35.6 3.1
17.0	47.57 +.06	82.1 2.3	53.79 -0.4	69.7 3.7	49.40 +.02	56.6 2.1	49.50 -0.4	32.4 3.4
27.0	47.67 .15	79.8 2.2	53.79 +.05	65.8 3.9	49.44 .07	54.4 2.4	49.49 +.03	28.8 3.6
Nov. 6.0	47.86 .24	77.8 1.9	53.89 .14	61.9 3.9	49.53 .12	51.9 2.6	49.55 .09	25.2 3.7
15.9	48.14 .32	76.0 1.6	54.06 .24	58.1 3.8	49.68 .17	49.3 2.7	49.68 .17	21.4 3.7
25.9	48.51 .40	74.6 1.2	54.37 .33	54.3 3.7	49.87 .21	46.5 2.8	49.88 .24	17.7 3.7
Dec. 5.9	48.94 .47	73.7 0.7	54.74 .42	50.7 3.4	50.10 .25	43.7 2.8	50.15 .30	14.1 3.5
15.9	49.44 .52	73.2 -0.2	55.20 .49	47.5 3.0	50.38 .29	40.9 2.7	50.48 .36	10.7 3.9
25.8	49.98 .55	73.3 +0.3	55.72 .55	44.7 2.6	50.69 .32	38.2 2.6	50.86 .40	7.6 2.9
35.8	50.54 +.56	73.9 +0.8	56.30 +.59	42.3 -2.1	51.01 +.33	35.7 -2.4	51.28 +.43	4.9 -2.4

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	*5 Ursæ Minoris.		α Centauri.		ε Bootis.		α Libræ.	
	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination South.
	<sup>h</sup> 14 <sup>m</sup> 27	<sup>°</sup> 76 <sup>'</sup> 15	<sup>h</sup> 14 <sup>m</sup> 30	<sup>°</sup> 60 <sup>'</sup> 17	<sup>h</sup> 14 <sup>m</sup> 39	<sup>°</sup> 27 <sup>'</sup> 36	<sup>h</sup> 14 <sup>m</sup> 43	<sup>°</sup> 15 <sup>'</sup> 30
Jan. 1.8	47.16 +.88	38.9 -2.4	53.52 +.54	50.1 +0.1	22.28 +.32	49.4 -2.6	46.21 +.32	21.6 +1.6
11.8	48.08 .95	36.9 1.8	54.07 .56	50.5 0.6	22.61 .34	46.9 2.3	46.54 .33	23.2 1.7
21.8	49.07 1.00	35.4 1.1	54.64 .56	51.3 1.1	22.95 .35	44.8 1.9	46.88 .34	25.0 1.7
31.7	50.08 1.01	34.6 -0.5	55.20 .55	52.6 1.5	23.30 .34	43.1 1.4	47.22 .33	26.7 1.7
Feb. 10.7	51.09 .98	34.5 +0.2	55.74 .53	54.3 1.9	23.64 .33	41.9 0.9	47.54 .32	28.4 1.6
20.7	52.05 .92	35.1 0.9	56.26 .49	56.3 2.2	23.96 .31	41.3 -0.4	47.85 .30	30.0 1.5
Mar. 1.7	52.93 .83	36.2 1.5	56.73 .45	58.6 2.4	24.25 .98	41.1 +0.1	48.13 .27	31.4 1.4
11.6	53.71 .71	38.0 2.0	57.16 .40	61.2 2.6	24.52 .25	41.4 0.5	48.39 .25	32.7 1.2
21.6	54.36 .58	40.2 2.4	57.53 .35	63.9 2.8	24.75 .21	42.2 1.0	48.63 .22	33.8 1.0
31.6	54.87 .43	42.9 2.8	57.85 .29	66.8 2.9	24.95 .18	43.3 1.3	48.83 .19	34.7 0.8
Apr. 10.5	55.22 .27	45.8 3.0	58.11 .23	69.7 2.9	25.11 .14	44.9 1.6	49.00 .16	35.5 0.7
20.5	55.40 +.10	48.9 3.1	58.31 .17	72.5 2.9	25.24 .11	46.6 1.8	49.14 .13	36.1 0.5
30.5	55.42 -.05	51.9 3.1	58.45 .11	75.4 2.8	25.33 .07	48.6 2.0	49.26 .10	36.5 0.4
May 10.5	55.29 .21	55.0 2.9	58.53 +.05	78.1 2.6	25.39 .04	50.6 2.0	49.34 .07	36.8 0.2
20.4	55.01 .25	57.8 2.7	58.55 -.01	80.7 2.5	25.41 +.01	52.6 2.0	49.40 .04	37.0 +0.1
30.4	54.60 .47	60.4 2.4	58.51 .07	83.0 2.2	25.40 -.02	54.6 1.9	49.43 +.01	37.1 0.0
June 9.4	54.06 .58	62.6 2.0	58.41 .13	85.1 1.9	25.36 .05	56.4 1.7	49.43 -.01	37.0 -0.1
19.4	53.43 .68	64.4 1.6	58.25 .18	86.9 1.6	25.29 .06	58.1 1.5	49.40 .04	36.9 0.1
29.3	52.71 .75	65.7 1.1	58.05 .23	88.3 1.2	25.20 .10	59.5 1.3	49.34 .07	36.8 0.2
July 9.3	51.93 .80	66.5 +0.5	57.79 .27	89.4 0.8	25.08 .12	60.7 1.0	49.26 .09	36.5 0.3
19.3	51.10 .84	66.8 0.0	57.50 .31	90.0 +0.4	24.95 .14	61.5 0.7	49.16 .11	36.2 0.3
29.2	50.25 .85	66.5 -0.5	57.18 .33	90.3 0.0	24.80 .16	62.0 +0.3	49.05 .13	35.8 0.4
Aug. 8.2	49.39 .85	65.8 1.0	56.83 .34	90.0 -0.4	24.64 .16	62.2 0.0	48.91 .14	35.4 0.4
18.2	48.55 .82	64.5 1.6	56.49 .34	89.4 0.9	24.47 .16	62.0 -0.4	48.77 .14	35.0 0.5
28.2	47.75 .77	62.7 2.0	56.15 .33	88.3 1.3	24.31 .16	61.4 0.7	48.63 .14	34.5 0.5
Sept. 7.1	47.00 .71	60.4 2.5	55.84 .29	86.8 1.6	24.15 .15	60.5 1.1	48.50 .12	34.0 0.4
17.1	46.33 .62	57.7 2.9	55.57 .24	85.0 1.9	24.02 .13	59.3 1.4	48.38 .10	33.6 0.4
27.1	45.76 .52	54.6 3.2	55.35 .18	83.0 2.1	23.90 .10	57.7 1.8	48.29 .08	33.3 0.3
Oct. 7.1	45.30 .29	51.2 3.5	55.20 .11	80.7 2.3	23.82 .06	55.8 2.1	48.23 -.04	33.0 -0.2
17.0	44.97 .26	47.6 3.7	55.14 -.02	78.4 2.3	23.78 -.02	53.5 2.4	48.21 .00	32.9 0.0
27.0	44.79 -.10	43.7 3.9	55.16 +.07	76.1 2.3	23.79 +.03	51.0 2.6	48.24 +.05	33.0 +0.2
Nov. 6.0	44.76 +.06	39.8 3.9	55.28 .16	73.9 2.1	23.84 .08	48.3 2.8	48.31 .10	33.3 0.4
15.9	44.90 .22	35.9 3.9	55.49 .26	71.9 1.8	23.95 .14	45.3 3.0	48.44 .15	33.8 0.7
25.9	45.20 .29	32.0 3.7	55.79 .34	70.2 1.5	24.12 .19	42.3 3.0	48.62 .20	34.6 0.9
Dec. 5.9	45.67 .54	28.4 2.5	56.17 .41	68.9 1.1	24.33 .23	39.2 3.1	48.85 .25	35.6 1.1
15.9	46.29 .69	25.0 3.1	56.62 .48	68.0 0.6	24.59 .28	36.2 3.0	49.11 .28	36.9 1.3
25.8	47.05 .81	22.1 2.7	57.13 .53	67.6 -0.2	24.88 .31	33.3 2.8	49.41 .31	38.3 1.5
35.8	47.91 +.90	19.7 -2.9	57.67 +.56	67.7 +0.3	25.20 +.33	30.6 -2.5	49.74 +.33	39.9 +1.6

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	* $\beta$ Ursæ Minoris.		$\beta$ Bootis.		$\beta$ Libræ.		$\mu$ Bootis.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination North.
	<sup>h</sup> 14 51	<sup>m</sup> 74 40	<sup>h</sup> 14 57	<sup>m</sup> 40 53	<sup>h</sup> 15 10	<sup>m</sup> 8 54	<sup>h</sup> 15 19	<sup>m</sup> 37 49
Jan. 1.8	3.67 +.74	28.5 -2.7	5.78 +.34	39.3 -2.9	5.40 +.30	26.4 +1.7	37.57 +.31	31.1 -3.0
11.8	4.46 .83	26.2 2.1	6.14 .36	36.7 2.4	5.71 .32	28.1 1.7	37.90 .34	28.3 2.6
21.8	5.32 .88	24.4 1.5	6.51 .36	34.4 2.0	6.03 .32	29.9 1.7	38.25 .36	25.9 2.1
31.8	6.23 .91	23.2 0.8	6.89 .38	32.8 1.4	6.36 .32	31.5 1.6	38.61 .36	24.0 1.6
Feb. 10.7	7.14 .90	22.8 -0.1	7.27 .37	31.6 0.8	6.68 .31	33.1 1.5	38.97 .36	22.7 1.1
20.7	8.02 .86	23.0 +0.5	7.63 .35	31.1 -0.2	6.99 .30	34.5 1.3	39.33 .35	21.9 -0.5
Mar. 1.7	8.86 .79	23.9 1.2	7.98 .33	31.2 +0.4	7.28 .28	35.7 1.1	39.67 .33	21.7 +0.1
11.7	9.61 .70	25.3 1.7	8.29 .29	31.8 0.9	7.55 .26	36.7 0.9	39.99 .30	22.1 0.7
21.6	10.26 .59	27.3 2.2	8.57 .26	33.0 1.4	7.79 .23	37.5 0.7	40.27 .27	23.1 1.2
31.6	10.79 .46	29.8 2.6	8.90 .21	34.6 1.8	8.01 .20	38.0 0.4	40.52 .23	24.4 1.6
Apr. 10.6	11.17 .32	32.6 2.9	9.00 .17	36.6 2.1	8.20 .18	38.3 +0.2	40.73 .19	26.3 2.0
20.5	11.42 .18	35.6 3.1	9.14 .13	38.9 2.4	8.37 .15	38.5 0.0	40.90 .15	28.4 2.3
30.5	11.53 +.04	38.7 3.1	9.25 .08	41.4 2.5	8.50 .12	38.4 -0.1	41.04 .11	30.8 2.4
May 10.5	11.50 -1.0	41.8 3.0	9.31 +.04	44.0 2.6	8.61 .09	38.3 0.2	41.13 .07	33.3 2.5
20.5	11.32 .24	44.8 2.9	9.34 .00	46.5 2.5	8.69 .06	38.0 0.3	41.18 +.03	35.8 2.5
30.4	11.02 .36	47.5 2.6	9.32 -.04	49.0 2.4	8.74 .03	37.7 0.4	41.19 -.01	38.3 2.4
June 9.4	10.61 .47	49.9 2.2	9.27 .07	51.3 2.2	8.76 +.01	37.3 0.4	41.16 .05	40.7 2.2
19.4	10.09 .56	52.0 1.8	9.17 .11	53.3 1.9	8.75 -.02	36.9 0.4	41.10 .06	42.8 2.0
29.4	9.49 .64	53.6 1.4	9.05 .14	55.0 1.6	8.72 .05	36.5 0.4	41.00 .11	44.7 1.7
July 9.3	8.81 .70	54.8 0.9	8.90 .16	56.4 1.2	8.65 .08	36.0 0.4	40.88 .14	46.3 1.4
19.3	8.09 .74	55.4 +0.4	8.72 .19	57.4 0.8	8.56 .10	35.6 0.4	40.72 .17	47.5 1.0
29.3	7.32 .77	55.5 -0.2	8.52 .20	58.0 +0.4	8.45 .12	35.2 0.4	40.54 .19	48.4 0.6
Aug. 8.2	6.54 .78	55.1 0.7	8.31 .21	58.2 -0.1	8.33 .13	34.8 0.4	40.34 .20	48.8 +0.2
18.2	5.76 .77	54.2 1.2	8.09 .22	57.9 0.5	8.19 .14	34.4 0.3	40.13 .21	48.8 -0.2
28.2	5.00 .74	52.7 1.7	7.88 .21	57.2 0.9	8.04 .14	34.2 0.3	39.91 .21	48.3 0.6
Sept. 7.2	4.28 .89	50.7 2.2	7.67 .20	56.1 1.4	7.90 .13	33.9 0.2	39.70 .21	47.5 1.1
17.1	3.62 .63	48.3 2.6	7.48 .18	54.5 1.8	7.77 .12	33.8 -0.1	39.50 .19	46.2 1.5
27.1	3.03 .54	45.5 3.0	7.31 .15	52.5 2.1	7.66 .10	33.7 0.0	39.33 .16	44.5 1.9
Oct. 7.1	2.54 .43	42.3 3.3	7.18 .11	50.2 2.5	7.58 .06	33.8 +0.2	39.18 .13	42.4 2.3
17.1	2.16 .31	38.9 3.6	7.09 .06	47.5 2.8	7.54 -.02	34.1 0.4	39.07 .09	40.0 2.6
27.0	1.91 .18	35.2 3.8	7.05 -.01	44.5 3.1	7.54 +.02	34.5 0.5	39.01 -.03	37.2 2.9
Nov. 6.0	1.80 -.04	31.3 3.9	7.06 +.03	41.2 3.3	7.58 .07	35.2 0.8	39.01 +.02	34.2 3.1
16.0	1.83 +.12	27.3 3.9	7.12 .09	37.8 3.5	7.68 .12	36.1 1.0	39.06 .08	30.9 3.3
25.9	2.03 .27	23.4 3.8	7.24 .15	34.3 3.5	7.83 .17	37.1 1.2	39.17 .14	27.5 3.4
Dec. 5.9	2.37 .49	19.7 3.6	7.42 .21	30.8 3.5	8.03 .22	38.4 1.4	39.34 .20	24.1 3.4
15.9	2.86 .56	16.1 3.3	7.66 .26	27.4 3.3	8.26 .26	39.9 1.5	39.56 .25	20.7 3.3
25.9	3.48 .68	13.0 2.9	7.94 .31	24.2 3.0	8.54 .29	41.5 1.7	39.83 .29	17.4 3.1
35.8	4.21 +.77	10.3 -2.5	8.27 +.34	21.3 -2.7	8.84 +.31	43.2 +1.7	40.14 +.39	14.5 -2.8

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	γ <sup>2</sup> Ursæ Minoris.		α Coronæ Borealis.		α Serpentis.		ε Serpentis.	
	Right Ascension.	Declination North.	Right Ascension	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	<sup>h</sup> 15 <sup>m</sup> 20	<sup>°</sup> 72 <sup>'</sup> 16	<sup>h</sup> 15 <sup>m</sup> 29	<sup>°</sup> 27 <sup>'</sup> 8	<sup>h</sup> 15 <sup>m</sup> 37	<sup>°</sup> 6 <sup>'</sup> 49	<sup>h</sup> 15 <sup>m</sup> 44	<sup>°</sup> 4 <sup>'</sup> 51
Jan. 1.9	54.27 +59	70.4 -3.0	14.32 +29	44.4 -2.8	55.94 +27	48.4 -2.2	24.28 +27	53.5 -2.2
11.8	54.91 .68	67.7 2.5	14.63 .31	41.7 2.5	56.23 .29	46.2 2.1	24.57 .29	51.3 2.0
21.8	55.63 .74	65.5 1.9	14.95 .33	39.3 2.2	56.53 .31	44.2 1.9	24.87 .31	49.4 1.9
31.8	56.39 .78	63.9 1.2	15.28 .33	37.4 1.7	56.85 .32	42.4 1.7	25.18 .31	47.6 1.7
Feb. 10.8	57.19 .79	63.0 -0.6	15.62 .33	35.9 1.3	57.16 .31	40.8 1.4	25.50 .31	46.0 1.4
20.7	57.98 .77	62.8 +0.1	15.95 .32	34.9 0.7	57.47 .30	39.6 1.1	25.81 .30	44.8 1.1
Mar. 1.7	58.73 .73	63.2 0.8	16.26 .30	34.4 -0.2	57.77 .29	38.7 0.7	26.10 .29	43.9 0.7
11.7	59.44 .67	64.3 1.4	16.55 .28	34.4 +0.3	58.05 .27	38.2 -0.3	26.38 .27	43.3 -0.4
21.7	60.07 .58	66.0 1.9	16.82 .25	35.0 0.8	58.30 .24	38.0 0.0	26.65 .25	43.1 0.0
31.6	60.60 .48	68.2 2.4	17.06 .22	35.9 1.2	58.54 .22	38.2 +0.3	26.88 .23	43.2 +0.3
Apr. 10.6	61.03 .37	70.8 2.7	17.27 .19	37.3 1.5	58.75 .19	38.7 0.6	27.10 .20	43.6 0.5
20.6	61.34 .25	73.7 3.0	17.45 .16	39.0 1.8	58.93 .17	39.5 0.9	27.29 .17	44.3 0.8
30.5	61.53 +13	76.7 3.1	17.59 .12	41.0 2.0	59.08 .14	40.4 1.0	27.44 .15	45.1 1.0
May 10.5	61.60 .00	79.9 3.1	17.70 .09	43.1 2.1	59.21 .11	41.6 1.2	27.58 .12	46.2 1.1
20.5	61.54 -11	82.9 3.0	17.77 .06	45.2 2.2	59.30 .08	43.8 1.2	27.68 .09	47.3 1.1
30.5	61.37 .22	85.9 2.8	17.81 +0.2	47.4 2.1	59.37 .05	44.0 1.2	27.75 .06	48.5 1.2
June 9.4	61.09 .33	88.6 2.5	17.81 -0.1	49.5 2.0	59.40 +0.2	45.3 1.2	27.79 +0.3	49.6 1.2
19.4	60.72 .42	91.0 2.2	17.78 .04	51.4 1.8	59.41 -0.1	46.5 1.2	27.81 .00	50.8 1.1
29.4	60.25 .50	93.0 1.8	17.72 .06	53.1 1.6	59.38 .04	47.6 1.1	27.79 -0.3	51.8 1.0
July 9.4	59.71 .57	94.6 1.3	17.63 .11	54.6 1.3	59.32 .07	48.6 0.9	27.74 .06	52.8 0.9
19.3	59.11 .62	95.6 0.8	17.51 .13	55.8 1.0	59.24 .09	49.5 0.8	27.66 .09	53.6 0.8
29.3	58.47 .66	96.2 +0.3	17.37 .15	56.7 0.7	59.14 .12	50.2 0.6	27.56 .11	54.3 0.6
Aug. 8.3	57.79 .69	96.3 -0.2	17.21 .17	57.2 +0.4	59.01 .14	50.7 0.4	27.43 .13	54.8 0.4
18.2	57.08 .71	95.8 0.7	17.03 .18	57.4 0.0	58.86 .15	51.0 +0.2	27.29 .15	55.2 0.3
28.2	56.40 .68	94.8 1.2	16.85 .18	57.2 -0.4	58.71 .15	51.2 0.0	27.14 .15	55.4 +0.1
Sept. 7.2	55.73 .65	93.3 1.7	16.66 .18	56.7 0.7	58.56 .15	51.1 -0.2	26.98 .15	55.3 -0.1
17.2	55.10 .61	91.3 2.2	16.49 .16	55.8 1.1	58.41 .14	50.8 0.4	26.83 .14	55.1 0.3
27.1	54.52 .54	88.9 2.6	16.34 .14	54.5 1.5	58.28 .12	50.2 0.6	26.70 .12	54.6 0.6
Oct. 7.1	54.01 .46	86.0 3.0	16.21 .11	52.9 1.8	58.17 .09	49.5 0.9	26.59 .09	54.0 0.8
17.1	53.60 .36	82.8 3.4	16.12 .07	50.9 2.1	58.10 .05	48.4 1.1	26.51 .06	53.1 1.0
27.1	53.29 .25	79.3 3.6	16.07 -0.2	48.6 2.4	58.06 -0.1	47.2 1.4	26.47 -0.1	51.9 1.3
Nov. 6.0	53.10 -12	75.6 3.8	16.07 +0.3	46.0 2.7	58.08 +0.4	45.7 1.6	26.48 +0.3	50.5 1.5
16.0	53.04 +0.1	71.7 3.9	16.12 .08	43.2 2.9	58.14 .08	43.9 1.8	26.53 .08	48.9 1.7
26.0	53.12 .14	67.8 3.9	16.23 .13	40.2 3.0	58.25 .13	42.0 2.0	26.64 .13	47.1 1.9
Dec. 5.9	53.33 .28	63.9 3.8	16.39 .18	37.2 3.1	58.41 .18	39.9 2.1	26.80 .18	45.1 2.0
15.9	53.68 .41	60.2 3.6	16.60 .23	34.1 3.0	58.61 .23	37.7 2.2	26.99 .22	43.0 2.1
25.9	54.15 .53	56.8 3.2	16.85 .27	31.1 2.9	58.86 .26	35.4 2.2	27.23 .26	40.9 2.2
35.9	54.73 +0.2	53.8 -2.8	17.14 +3.0	28.2 -2.7	59.13 +2.9	33.2 -2.2	27.51 +2.8	38.7 -2.1

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ζ Ursa Minoris.		ε Coronæ Borealis.		δ Scorpîi.		β <sup>1</sup> Scorpîi.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination South.
	<sup>h</sup> 15 48	<sup>m</sup> 78° 10'	<sup>h</sup> 15 52	<sup>m</sup> 27° 14'	<sup>h</sup> 15 52	<sup>m</sup> 22° 15'	<sup>h</sup> 15 57	<sup>m</sup> 19° 27'
Jan. 1.9	36.88 +.71	62.1 -3.1	15.50 +.37	56.0 -2.9	43.82 +.29	10.8 +0.9	57.56 +.29	5.0 +1.0
11.9	37.67 .87	59.2 2.7	15.79 .30	53.2 2.6	44.13 .32	11.8 1.1	57.86 .31	6.1 1.1
21.8	38.61 .98	56.8 2.1	16.10 .32	50.8 2.3	44.46 .33	12.9 1.2	58.18 .33	7.3 1.2
31.8	39.64 1.07	54.9 1.5	16.42 .33	48.7 1.9	44.79 .34	14.1 1.2	58.52 .33	8.6 1.2
Feb. 10.8	40.75 1.19	53.8 0.8	16.75 .33	47.0 1.4	45.14 .34	15.3 1.2	58.85 .33	9.8 1.2
20.8	41.88 1.19	53.2 -0.3	17.08 .32	45.9 0.9	45.47 .33	16.6 1.2	59.18 .33	11.0 1.2
Mar. 1.7	42.99 1.08	53.4 +0.5	17.40 .31	45.3 -0.3	45.80 .32	17.8 1.1	59.50 .31	12.1 1.1
11.7	44.05 1.01	54.2 1.1	17.70 .29	45.2 +0.2	46.10 .30	18.9 1.1	59.81 .30	13.2 1.0
21.7	45.02 .91	55.6 1.7	17.98 .27	45.7 0.7	46.40 .28	19.9 0.9	60.09 .28	14.1 0.8
31.6	45.86 .77	57.6 2.2	18.24 .24	46.6 1.1	46.66 .25	20.8 0.8	60.36 .26	14.8 0.7
Apr. 10.6	46.56 .62	60.0 2.6	18.47 .21	47.9 1.5	46.91 .23	21.6 0.7	60.60 .23	15.5 0.6
20.6	47.09 .44	62.8 2.9	18.66 .18	49.5 1.8	47.12 .20	22.3 0.6	60.82 .20	16.0 0.5
30.6	47.45 .26	65.7 3.1	18.83 .15	51.5 2.0	47.32 .18	22.9 0.5	61.01 .18	16.4 0.4
May 10.5	47.62 +.08	68.9 3.1	18.96 .11	53.6 2.2	47.48 .15	23.4 0.5	61.18 .15	16.7 0.3
20.5	47.60 -1.11	72.0 3.1	19.05 .08	55.8 2.2	47.61 .11	23.8 0.4	61.31 .12	17.0 0.2
30.5	47.41 .28	75.0 2.9	19.12 .04	58.1 2.2	47.70 .06	24.1 0.3	61.41 .09	17.2 0.1
June 9.5	47.04 .45	77.9 2.7	19.14 +.01	60.3 2.1	47.77 .05	24.4 0.3	61.48 .06	17.3 +0.1
19.4	46.51 .60	80.4 2.4	19.13 -0.03	62.3 2.0	47.80 +.01	24.7 0.2	61.52 +.02	17.4 0.0
29.4	45.84 .74	82.7 2.0	19.08 .06	64.2 1.7	47.80 -0.02	24.8 0.1	61.52 -0.02	17.4 0.0
July 9.4	45.04 .86	84.5 1.6	19.00 .09	65.8 1.5	47.76 .06	25.0 +0.1	61.48 .05	17.4 -0.1
19.3	44.13 .95	85.9 1.1	18.89 .12	67.2 1.2	47.68 .09	25.0 0.0	61.41 .08	17.4 0.1
29.3	43.14 1.02	86.8 0.6	18.76 .15	68.3 0.9	47.58 .12	25.0 -0.1	61.31 .11	17.3 0.2
Aug. 8.3	42.08 1.07	87.1 +0.1	18.60 .17	69.0 0.5	47.45 .14	24.9 0.2	61.19 .13	17.2 0.2
18.3	40.99 1.10	87.0 -0.4	18.42 .18	69.4 +0.2	47.30 .15	24.7 0.2	61.05 .15	16.9 0.3
28.2	39.88 1.10	86.4 0.9	18.23 .19	69.4 -0.2	47.14 .16	24.4 0.3	60.89 .16	16.7 0.3
Sept. 7.2	38.79 1.07	85.2 1.4	18.04 .19	69.0 0.6	46.98 .16	24.1 0.4	60.72 .16	16.4 0.3
17.2	37.74 1.02	83.5 1.9	17.86 .18	68.2 0.9	46.82 .15	23.7 0.4	60.57 .15	16.1 0.3
27.2	36.76 .94	81.4 2.3	17.69 .16	67.1 1.3	46.68 .13	23.2 0.4	60.43 .13	15.8 0.3
Oct. 7.1	35.87 .83	78.8 2.8	17.54 .13	65.6 1.7	46.56 .10	22.8 0.4	60.31 .10	15.5 0.3
17.1	35.10 .70	75.9 3.1	17.43 .09	63.8 2.0	46.47 .06	22.5 0.3	60.22 .06	15.2 0.2
27.1	34.47 .55	72.6 3.4	17.35 -0.05	61.6 2.3	46.43 -0.02	22.2 0.2	60.18 -0.02	15.1 -0.1
Nov. 6.0	34.00 .37	69.0 3.7	17.33 .00	59.1 2.6	46.44 +0.04	22.0 -0.1	60.18 +0.03	15.1 0.0
16.0	33.72 -1.18	65.3 3.8	17.35 +0.05	56.4 2.8	46.51 .09	21.9 0.0	60.24 .08	15.2 +0.2
26.0	33.64 +0.02	61.4 3.8	17.43 .11	53.5 3.0	46.63 .14	22.1 +0.2	60.35 .14	15.5 0.4
Dec. 6.0	33.75 .22	57.6 3.8	17.56 .16	50.4 3.1	46.80 .19	22.4 0.4	60.51 .19	16.0 0.6
15.9	34.08 .42	53.9 3.6	17.75 .21	47.3 3.1	47.01 .24	23.0 0.6	60.72 .23	16.6 0.8
25.9	34.59 .60	50.3 3.3	17.98 .25	44.3 3.0	47.27 .28	23.7 0.8	60.97 .27	17.5 0.9
35.9	35.28 +.78	47.2 -3.0	18.24 +.28	41.4 -2.8	47.57 +.31	24.6 +1.0	61.26 +.30	18.5 +1.1



## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	*Groombridge 2320.		δ Ophiuchi.		τ Herculis.		α Scorpii. (Antares.)	
	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination South.
	<sup>h</sup> 16	<sup>m</sup> 5	<sup>h</sup> 16	<sup>m</sup> 7	<sup>h</sup> 16	<sup>m</sup> 15	<sup>h</sup> 16	<sup>m</sup> 21
Jan. 1.9	55.93 +.41	40.5 -3.3	36.96 +.28	43.7 +1.7	51.38 +.27	61.3 -3.3	31.31 +.28	38.0 +2.5
	11.9 56.39 .40	37.4 2.9	36.53 .28	45.4 1.7	51.68 .32	58.2 3.0	31.61 .31	38.6 0.7
	21.8 56.92 .56	34.7 2.4	36.83 .30	47.1 1.6	52.02 .35	55.4 2.6	31.93 .33	38.4 0.8
	31.8 57.51 .61	32.5 1.8	37.14 .31	48.7 1.5	52.38 .37	53.0 2.1	32.27 .34	40.3 0.9
Feb. 10.8	58.15 .64	31.0 1.2	37.45 .31	50.2 1.3	52.77 .39	51.2 1.5	32.62 .34	41.2 1.0
	20.8 58.80 .65	30.1 -0.5	37.76 .31	51.4 1.1	53.16 .39	50.0 0.9	32.96 .34	42.2 1.0
Mar. 1.7	59.45 .63	29.9 +0.1	38.06 .30	52.4 0.8	53.55 .38	49.5 -0.2	33.30 .33	43.2 1.0
	11.7 60.07 .60	30.4 -0.7	38.35 .28	53.1 0.8	53.92 .36	49.6 +0.4	33.63 .32	44.1 0.9
	21.7 60.65 .55	31.5 1.4	38.63 .26	53.5 +0.3	54.27 .34	50.3 1.0	33.94 .30	45.0 0.9
	31.6 61.17 .48	33.2 2.0	38.88 .24	53.7 0.0	54.60 .31	51.5 1.5	34.24 .28	45.8 0.8
Apr. 10.6	61.62 .41	35.5 2.4	39.12 .22	53.6 -0.2	54.89 .27	53.3 2.0	34.51 .26	46.6 0.7
	20.6 61.98 .32	38.1 2.8	39.33 .20	53.3 0.4	55.13 .23	55.6 2.4	34.76 .24	47.3 0.7
	30.6 62.26 .22	41.0 3.0	39.51 .17	52.8 0.5	55.34 .18	58.1 2.6	34.99 .21	48.0 0.6
May 10.5	62.43 .13	44.1 3.1	39.67 .14	52.2 0.7	55.50 .14	60.9 2.8	35.18 .18	48.6 0.6
	20.5 62.51 +.03	47.2 2.2	39.80 .11	51.5 0.8	55.61 .09	63.7 2.9	35.35 .15	49.2 0.5
	30.5 62.50 -0.06	50.4 3.1	39.90 .08	50.7 0.8	55.67 +.04	66.7 2.9	35.48 .11	49.7 0.5
June 9.5	62.38 .16	53.4 2.9	39.97 .06	49.9 0.8	55.68 -0.02	69.5 2.8	35.58 .08	50.2 0.5
	19.4 62.18 .24	56.2 2.6	40.00 +.02	49.1 0.8	55.65 .06	72.2 2.6	35.64 +.04	50.6 0.4
	29.4 61.89 .33	58.7 2.3	40.01 -0.01	48.4 0.7	55.56 .11	74.7 2.3	35.66 .00	51.0 0.4
July 9.4	61.53 .40	60.8 1.9	39.97 .04	47.7 0.7	55.44 .15	76.9 2.0	35.64 -0.04	51.3 0.3
	19.3 61.10 .46	62.5 1.5	39.91 .07	47.1 0.6	55.27 .19	78.7 1.6	35.58 .07	51.6 0.2
	29.3 60.61 .51	63.8 1.0	39.82 .10	46.5 0.5	55.06 .22	80.1 1.2	35.49 .11	51.8 +0.1
Aug. 8.3	60.08 .56	64.6 +0.5	39.70 .13	46.1 0.4	54.83 .25	81.1 0.8	35.37 .13	51.9 0.0
	18.3 59.51 .57	64.8 0.0	39.57 .14	45.7 0.3	54.56 .27	81.7 +0.3	35.22 .16	51.9 -0.1
	28.2 58.93 .58	64.6 -0.5	39.42 .15	45.5 -0.2	54.29 .28	81.8 -0.2	35.05 .17	51.7 0.2
Sept. 7.2	58.35 .58	63.8 1.1	39.26 .16	45.4 0.0	54.00 .28	81.3 0.6	34.88 .17	51.5 0.2
	17.2 57.78 .55	62.4 1.6	39.11 .15	45.4 +0.1	53.72 .27	80.5 1.1	34.70 .17	51.2 0.4
	27.2 57.24 .51	60.6 2.0	38.96 .13	45.6 0.2	53.46 .25	79.1 1.6	34.54 .15	50.8 0.4
Oct. 7.1	56.75 .46	58.4 2.5	38.84 .11	45.9 0.4	53.22 .22	77.3 2.0	34.40 .12	50.3 0.5
	17.1 56.32 .30	55.7 2.9	38.75 .07	46.4 0.6	53.01 .18	75.0 2.4	34.29 .09	49.8 0.5
	27.1 55.97 .30	52.6 3.3	38.70 -0.02	47.1 0.8	52.85 .13	72.4 2.8	34.22 -0.04	49.4 0.4
Nov. 6.0	55.71 .21	49.2 3.5	38.69 +0.1	48.0 1.0	52.75 .07	69.4 3.1	34.20 +0.1	49.0 0.4
	16.0 55.55 -1.0	45.5 3.7	38.72 .06	49.0 1.2	52.71 -0.01	66.1 3.4	34.24 .06	48.7 0.2
	26.0 55.51 +0.1	41.7 3.9	38.81 .11	50.3 1.4	52.72 +0.05	62.6 3.6	34.33 .12	48.5 -0.1
Dec. 6.0	55.58 .13	37.8 3.9	38.95 .16	51.8 1.5	52.81 .19	59.0 3.6	34.47 .17	48.5 +0.1
	15.9 55.77 .24	34.0 3.8	39.13 .20	53.4 1.6	52.96 .18	55.3 3.6	34.67 .22	48.7 0.2
	25.9 56.06 .35	30.3 3.5	39.36 .24	55.1 1.7	53.18 .24	51.8 3.5	34.91 .26	49.0 0.4
	35.9 56.46 +.44	26.9 -3.2	39.62 +.27	56.8 +1.7	53.45 +.29	48.4 -3.2	35.20 +.29	49.5 +0.6

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\eta$ Draconis.		*A Draconis.		$\zeta$ Ophiuchi.		* $\alpha$ Trianguli Australis.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination South.
	<sup>h</sup> 16 22	<sup>m</sup> 61 47	<sup>h</sup> 16 28	<sup>m</sup> 69 2	<sup>h</sup> 16 30	<sup>m</sup> 10 18	<sup>h</sup> 16 35	<sup>m</sup> 68 47
Jan. 1.9	13.21 +.32	66.4 -3.4	11.62 +.36	32.4 -3.5	4.50 +.25	17.9 +1.3	2.84 +.56	8.0 -1.6
11.9	13.57 .39	63.1 3.1	12.03 .46	29.1 3.1	4.77 .38	18.6 1.4	3.44 .64	6.5 1.3
21.8	13.99 .45	60.2 2.6	12.54 .54	26.2 2.6	5.05 .30	19.9 1.3	4.12 .70	5.4 0.9
31.8	14.46 .49	57.8 2.1	13.12 .60	23.9 2.1	5.36 .31	21.2 1.3	4.85 .74	4.7 -0.5
Feb. 10.8	14.97 .52	56.0 1.4	13.75 .65	22.1 1.5	5.67 .31	22.5 1.2	5.60 .77	4.5 0.0
20.8	15.50 .53	54.9 0.8	14.41 .67	20.9 0.8	5.99 .31	23.6 1.0	6.38 .78	4.7 +0.4
Mar. 1.7	16.02 .52	54.4 -0.1	15.08 .66	20.5 -0.1	6.30 .31	24.5 0.8	7.16 .77	5.2 0.8
11.7	16.53 .50	54.7 +0.5	15.74 .64	20.7 +0.5	6.60 .30	25.2 0.6	7.92 .75	6.2 1.1
21.7	17.01 .46	55.5 1.2	16.36 .60	21.5 1.2	6.89 .28	25.8 0.4	8.65 .71	7.5 1.5
31.7	17.46 .42	57.0 1.7	16.93 .54	23.0 1.8	7.16 .26	26.1 +0.2	9.34 .67	9.2 1.8
Apr. 10.6	17.85 .36	59.0 2.2	17.43 .46	25.0 2.2	7.42 .24	26.2 0.0	9.99 .62	11.1 2.0
20.6	18.18 .30	61.5 2.6	17.85 .38	27.5 2.6	7.65 .22	26.2 -0.1	10.58 .55	13.2 2.3
30.6	18.44 .23	64.2 2.9	18.18 .28	30.3 2.9	7.86 .20	26.0 0.2	11.09 .48	15.6 2.5
May 10.5	18.64 .15	67.2 3.1	18.42 .18	33.3 3.1	8.05 .17	25.7 0.3	11.54 .40	18.2 2.6
20.5	18.75 +.08	70.4 3.2	18.55 +.06	36.5 3.2	8.20 .14	25.3 0.4	11.90 .31	20.8 2.7
30.5	18.79 .00	73.6 3.1	18.58 -.02	39.7 3.2	8.33 .11	24.8 0.5	12.16 .22	23.5 2.7
June 9.5	18.76 -.07	76.6 3.0	18.51 .12	42.9 3.0	8.42 .08	24.4 0.5	12.34 .12	26.2 2.7
19.4	18.66 .14	79.5 2.8	18.34 .22	45.8 2.8	8.48 .04	23.9 0.5	12.41 +.03	28.8 2.6
29.4	18.48 .21	82.2 2.5	18.08 .30	48.5 2.5	8.51 +.01	23.4 0.4	12.39 -.07	31.3 2.4
July 9.4	18.24 .27	84.5 2.1	17.73 .39	50.9 2.2	8.50 -.03	23.0 0.4	12.27 .17	33.6 2.2
19.4	17.94 .32	86.4 1.7	17.30 .46	52.8 1.8	8.45 .06	22.6 0.4	12.05 .26	35.6 1.9
29.3	17.59 .37	88.0 1.3	16.81 .52	54.4 1.3	8.37 .09	22.3 0.3	11.74 .34	37.3 1.5
Aug. 8.3	17.20 .41	89.0 0.8	16.27 .57	55.4 0.8	8.26 .12	22.0 0.3	11.37 .41	38.7 1.1
18.3	16.78 .43	89.5 +0.3	15.68 .60	56.0 +0.3	8.13 .14	21.7 0.2	10.92 .46	39.6 0.7
28.2	16.33 .45	89.6 -0.2	15.07 .62	56.1 -0.2	7.98 .16	21.5 0.2	10.44 .49	40.1 +0.2
Sept. 7.2	15.88 .45	89.1 0.7	14.44 .62	55.6 0.7	7.82 .16	21.4 0.1	9.94 .50	40.1 -0.3
17.2	15.44 .44	88.1 1.3	13.82 .61	54.6 1.3	7.66 .16	21.3 -0.1	9.44 .49	39.6 0.7
27.2	15.01 .41	86.6 1.8	13.23 .58	53.1 1.7	7.51 .14	21.2 0.0	8.96 .45	38.6 1.2
Oct. 7.1	14.62 .37	84.6 2.2	12.67 .52	51.1 2.2	7.37 .12	21.3 +0.1	8.53 .39	37.2 1.6
17.1	14.27 .32	82.1 2.7	12.18 .46	48.7 2.7	7.27 .09	21.5 0.2	8.18 .31	35.4 1.9
27.1	13.98 .26	79.3 3.0	11.76 .39	45.8 3.0	7.19 -.05	21.8 0.4	7.91 .21	33.3 2.2
Nov. 6.1	13.77 .17	76.0 3.4	11.43 .28	42.6 3.4	7.17 .00	22.3 0.5	7.76 -.09	31.0 2.4
16.0	13.64 -.09	72.5 3.6	11.20 .17	39.1 3.6	7.19 +.05	22.9 0.7	7.73 +.03	28.6 2.5
26.0	13.59 .00	68.8 3.8	11.08 -.05	35.3 3.8	7.26 .10	23.7 0.9	7.83 .16	26.1 2.4
Dec. 6.0	13.64 +.09	65.0 3.8	11.09 +.07	31.5 3.8	7.38 .14	24.6 1.0	8.05 .28	23.7 2.3
15.9	13.78 .18	61.1 3.8	11.22 .18	27.6 3.8	7.55 .19	25.7 1.2	8.40 .40	21.4 2.1
25.9	14.01 .27	57.4 3.6	11.46 .30	23.9 3.6	7.77 .23	27.0 1.3	8.86 .51	19.4 1.8
35.9	14.32 +.34	53.9 -3.3	11.81 +.40	20.4 -3.3	8.01 +.26	28.3 +1.3	9.41 +.59	17.7 -1.5

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\eta$ Herculis.		$\kappa$ Ophiuchi.		$d$ Herculis.		$\epsilon$ Ursæ Minoris.	
	Right Ascension.	Declination North.	Right Ascension	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	<sup>h</sup> 16 38	<sup>m</sup> 39 9'	<sup>h</sup> 16 51	<sup>m</sup> 9 34'	<sup>h</sup> 16 56	<sup>m</sup> 33 45'	<sup>h</sup> 16 58	<sup>m</sup> 82 14'
Jan. 1.9	28.35 +.34	55.8 -3.3	34.43 +.21	32.2 -2.2	50.53 +.21	13.8 -3.1	63.18 +.55	30.2 -3.5
11.9	28.61 .38	52.6 3.0	34.67 .25	30.0 2.2	50.76 .25	10.7 2.9	63.88 .84	26.9 3.2
21.9	28.90 .31	49.8 2.7	34.93 .27	27.9 2.0	51.03 .28	7.9 2.6	64.86 1.10	23.9 2.8
31.8	29.23 .33	47.3 2.2	35.21 .29	26.0 1.8	51.33 .31	5.4 2.2	66.08 1.30	21.3 2.3
Feb. 10.8	29.57 .35	45.4 1.7	35.50 .30	24.4 1.5	51.65 .32	3.4 1.8	67.49 1.47	19.3 1.7
20.8	29.92 .35	44.0 1.1	35.80 .30	23.1 1.1	51.98 .33	1.9 1.2	69.03 1.58	17.9 1.1
Mar. 1.8	30.27 .35	43.1 -0.5	36.11 .30	22.1 0.7	52.31 .33	0.9 0.7	70.65 1.63	17.2 -0.4
11.7	30.62 .34	42.9 +0.1	36.40 .29	21.6 -0.3	52.64 .32	0.5 -0.1	72.29 1.61	17.1 +0.2
21.7	30.95 .32	43.3 0.7	36.69 .28	21.5 +0.1	52.96 .31	0.7 +0.5	73.88 1.54	17.6 0.8
31.7	31.26 .30	44.3 1.2	36.96 .26	21.7 0.4	53.26 .29	1.5 1.0	75.37 1.41	18.8 1.4
Apr. 10.7	31.55 .27	45.8 1.7	37.22 .25	22.3 0.8	53.55 .27	2.7 1.5	76.71 1.24	20.5 2.0
20.6	31.80 .24	47.7 2.1	37.46 .23	23.3 1.1	53.80 .24	4.4 1.9	77.85 1.02	22.7 2.4
30.6	32.02 .20	49.9 2.4	37.67 .20	24.4 1.3	54.03 .21	6.4 2.2	78.75 .78	25.3 2.7
May 10.6	32.20 .16	52.5 2.6	37.86 .17	25.8 1.4	54.23 .18	8.8 2.4	79.40 .51	28.2 3.0
20.5	32.34 .12	55.2 2.7	38.02 .15	27.3 1.6	54.39 .14	11.3 2.6	79.78 +.23	31.2 3.1
30.5	32.44 .08	57.9 2.8	38.15 .11	28.9 1.6	54.51 .10	14.0 2.6	79.87 -0.05	34.4 3.1
June 9.5	32.49 +.03	60.7 2.7	38.25 .08	30.6 1.6	54.59 .06	16.6 2.6	79.68 .33	37.5 3.1
19.5	32.50 -0.01	63.4 2.6	38.31 .04	32.1 1.5	54.63 +.02	19.2 2.5	79.21 .60	40.5 2.9
29.4	32.47 .06	65.8 2.4	38.34 +0.01	33.6 1.4	54.63 -0.02	21.6 2.3	78.48 .85	43.3 2.7
July 9.4	32.39 .10	68.1 2.1	38.33 -0.03	35.0 1.3	54.58 .07	23.9 2.1	77.51 1.06	45.8 2.4
19.4	32.27 .14	70.0 1.8	38.28 .06	36.2 1.1	54.49 .11	25.9 1.8	76.32 1.28	48.0 2.0
29.4	32.11 .17	71.6 1.4	38.20 .09	37.3 0.9	54.37 .14	27.5 1.5	74.94 1.46	49.8 1.6
Aug. 8.3	31.92 .20	72.8 1.0	38.09 .12	38.1 0.7	54.21 .17	28.9 1.1	73.41 1.60	51.2 1.1
18.3	31.71 .22	73.6 0.6	37.96 .15	38.7 0.5	54.02 .20	29.8 0.8	71.74 1.71	52.1 0.6
28.3	31.48 .24	74.0 +0.1	37.80 .16	39.1 +0.3	53.81 .22	30.4 +0.3	69.99 1.78	52.5 +0.2
Sept. 7.2	31.23 .25	73.9 -0.3	37.63 .17	39.2 0.0	53.59 .23	30.5 -0.1	68.19 1.81	52.4 -0.3
17.2	30.98 .24	73.4 0.7	37.46 .17	39.1 -0.2	53.36 .22	30.2 0.4	66.38 1.79	51.8 0.8
27.2	30.74 .23	72.4 1.2	37.29 .16	38.8 0.5	53.14 .22	29.5 0.9	64.61 1.74	50.7 1.3
Oct. 7.2	30.53 .21	71.0 1.6	37.14 .14	38.2 0.8	52.93 .20	28.4 1.3	62.90 1.64	49.1 1.8
17.1	30.33 .17	69.1 2.1	37.01 .11	37.3 1.0	52.74 .17	26.8 1.8	61.32 1.50	47.1 2.3
27.1	30.18 .13	66.8 2.4	36.91 .08	36.1 1.3	52.60 .13	24.9 2.1	59.90 1.32	44.6 2.7
Nov. 6.1	30.08 .08	64.2 2.8	36.85 -0.04	34.7 1.5	52.49 .08	22.6 2.5	58.67 1.11	41.7 3.0
16.1	30.03 -0.02	61.3 3.1	36.84 +0.01	33.0 1.8	52.43 -0.03	19.9 2.8	57.68 .85	38.5 3.3
26.0	30.03 +0.04	58.1 3.3	36.87 .06	31.2 2.0	52.43 +0.02	17.0 3.0	56.96 .57	35.1 3.5
Dec. 6.0	30.10 .09	54.7 3.4	36.95 .11	29.1 2.1	52.48 .08	13.9 3.2	56.54 -0.27	31.5 3.7
16.0	30.22 .15	51.3 3.4	37.09 .15	26.9 2.2	52.58 .13	10.6 3.2	56.43 +0.04	27.8 3.7
25.9	30.41 .21	47.9 3.4	37.26 .19	24.7 2.2	52.74 .18	7.4 3.2	56.63 .36	24.1 3.6
35.9	30.64 +.25	44.6 -3.2	37.48 +.23	22.5 -2.2	52.95 +.22	4.2 -3.1	57.14 +.66	20.6 -3.4

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha^1$ Herculis.		44 Ophiuchi.		$\beta$ Draconis.		$\alpha$ Ophiuchi.	
	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	<sup>h</sup> 17 <sup>m</sup> 8	<sup>°</sup> 14 <sup>'</sup> 32	<sup>h</sup> 17 <sup>m</sup> 18	<sup>°</sup> 24 <sup>'</sup> 3	<sup>h</sup> 17 <sup>m</sup> 27	<sup>°</sup> 52 <sup>'</sup> 23	<sup>h</sup> 17 <sup>m</sup> 28	<sup>°</sup> 12 <sup>'</sup> 39
Jan. 1.9	46.51 +.30	14.7 -2.5	30.68 +.33	14.1 +0.3	29.89 +.18	42.5 -3.6	57.35 +.18	16.1 -2.3
11.9	46.73 .33	12.3 2.3	30.93 .36	14.5 0.4	30.10 .34	39.0 3.4	57.56 .32	13.8 2.2
21.8	46.98 .36	10.1 2.1	31.21 .39	15.0 0.5	30.37 .30	35.7 3.1	57.79 .34	11.6 2.1
31.8	47.25 .38	8.0 1.9	31.51 .31	15.5 0.5	30.69 .34	32.8 2.7	58.05 .37	9.6 1.8
Feb. 10.8	47.54 .39	6.3 1.6	31.83 .32	16.1 0.6	31.06 .36	30.4 2.1	58.32 .38	7.9 1.6
20.8	47.84 .30	4.9 1.3	32.16 .33	16.7 0.5	31.45 .40	28.5 1.5	58.61 .39	6.5 1.2
Mar. 1.8	48.14 .30	4.0 0.8	32.49 .33	17.2 0.5	31.85 .41	27.3 0.9	58.91 .30	5.5 0.8
11.7	48.44 .30	3.4 -0.3	32.82 .33	17.6 0.5	32.27 .41	26.7 -0.3	59.21 .30	4.9 -0.4
21.7	48.73 .39	3.3 +0.1	33.15 .32	18.1 0.4	32.68 .41	26.8 +0.4	59.50 .39	4.7 0.0
31.7	49.02 .37	3.6 0.5	33.47 .31	18.5 0.3	33.08 .39	27.5 1.0	59.79 .38	5.0 +0.5
Apr. 10.7	49.28 .36	4.4 0.9	33.77 .30	18.8 0.3	33.45 .36	28.8 1.6	60.07 .37	5.7 0.8
20.6	49.53 .34	5.5 1.2	34.06 .38	19.0 0.2	33.80 .39	30.6 2.1	60.33 .35	6.7 1.2
30.6	49.76 .31	6.9 1.5	34.33 .36	19.2 0.2	34.10 .38	32.9 2.5	60.57 .33	8.0 1.4
May 10.6	49.96 .19	8.5 1.7	34.58 .33	19.4 0.2	34.36 .34	35.6 2.8	60.79 .31	9.5 1.6
20.5	50.14 .16	10.3 1.8	34.79 .30	19.6 0.2	34.57 .18	38.6 3.0	60.98 .18	11.2 1.8
30.5	50.28 .13	12.1 1.9	34.98 .17	19.8 0.2	34.73 .13	41.7 3.1	61.14 .15	13.1 1.8
June 9.5	50.39 .09	14.1 1.9	35.13 .13	20.0 0.2	34.83 .07	44.8 3.2	61.27 .11	14.9 1.9
19.5	50.46 .06	15.9 1.8	35.25 .10	20.2 0.2	34.86 +.01	48.0 3.1	61.37 .08	16.8 1.8
29.4	50.50 +.02	17.7 1.7	35.32 .05	20.4 0.2	34.84 -.05	51.0 2.9	61.42 +.04	18.6 1.7
July 9.4	50.50 -.02	19.4 1.6	35.36 +.01	20.7 0.2	34.76 .11	53.8 2.7	61.44 .00	20.2 1.6
19.4	50.46 .06	20.9 1.4	35.35 -.03	20.9 0.2	34.62 .17	56.4 2.4	61.42 -.04	21.7 1.4
29.4	50.39 .09	22.1 1.2	35.30 .07	21.2 0.2	34.43 .22	58.6 2.0	61.36 .08	23.0 1.2
Aug. 8.3	50.28 .12	23.2 0.9	35.21 .11	21.4 0.2	34.19 .26	60.5 1.6	61.27 .11	24.1 1.0
18.3	50.14 .15	24.0 0.6	35.08 .14	21.5 0.1	33.91 .30	61.9 1.2	61.14 .14	24.9 0.7
28.3	49.98 .17	24.5 0.4	34.93 .16	21.6 +0.1	33.59 .32	62.8 0.7	60.99 .16	25.5 0.4
Sept. 7.2	49.81 .18	24.7 +0.1	34.76 .17	21.7 0.0	33.26 .34	63.3 +0.2	60.82 .17	25.8 +0.2
17.2	49.63 .18	24.6 -0.2	34.50 .18	21.6 -0.1	32.91 .35	63.3 -0.3	60.64 .18	25.9 -0.1
27.2	49.45 .17	24.3 0.5	34.41 .17	21.5 0.1	32.56 .34	62.8 0.8	60.46 .18	25.6 0.4
Oct. 7.2	49.28 .16	23.6 0.8	34.24 .15	21.3 0.2	32.22 .32	61.7 1.3	60.29 .16	25.1 0.7
17.1	49.13 .13	22.7 1.1	34.10 .13	21.1 0.2	31.91 .29	60.2 1.8	60.14 .14	24.3 1.0
27.1	49.02 .10	21.4 1.4	33.99 .09	20.9 0.2	31.63 .25	58.2 2.2	60.01 .11	23.2 1.2
Nov. 6.1	48.94 .06	19.8 1.7	33.92 -.04	20.7 0.2	31.41 .20	55.7 2.7	59.92 .07	21.8 1.5
16.0	48.91 -.01	18.0 1.9	33.90 .00	20.5 0.2	31.24 .14	52.8 3.0	59.87 -.02	20.1 1.8
26.0	48.92 +.04	16.0 2.2	33.93 +.06	20.4 -0.1	31.13 -.07	49.7 3.3	59.87 +.02	18.3 2.0
Dec. 6.0	48.98 -.09	13.7 2.3	34.01 .11	20.4 0.0	31.09 .00	46.2 3.5	59.92 .07	16.2 2.2
16.0	49.09 .13	11.3 2.4	34.15 .16	20.5 +0.1	31.12 +.07	42.6 3.6	60.01 .11	13.9 2.3
25.9	49.25 .18	8.9 2.4	34.33 .21	20.7 0.2	31.23 .14	38.9 3.6	60.15 .16	11.6 2.3
35.9	49.45 +.21	6.4 -2.4	34.56 +.24	21.0 +0.3	31.40 +.20	35.3 -3.5	60.33 +.20	9.3 -2.3

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	α Draconis.		μ Herculis.		ψ¹ Draconis.		γ Draconis.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	<sup>h</sup> 17 <sup>m</sup> 37	<sup>°</sup> 68 <sup>'</sup> 48	<sup>h</sup> 17 <sup>m</sup> 41	<sup>°</sup> 27 <sup>'</sup> 47	<sup>h</sup> 17 <sup>m</sup> 44	<sup>°</sup> 72 <sup>'</sup> 12	<sup>h</sup> 17 <sup>m</sup> 58	<sup>°</sup> 51 <sup>'</sup> 29
Jan. 1.9	38.71 +.18	52.6 -3.7	24.73 +.16	46.2 -3.0	9.19 +.17	33.7 -3.7	35.61 +.14	71.9 -3.6
11.9	38.95 .99	48.9 3.5	24.92 .90	43.3 2.8	9.43 .30	30.1 3.5	35.78 .90	68.3 3.4
21.9	39.29 .39	45.6 3.3	25.14 .94	40.5 2.6	9.80 .43	26.7 3.3	36.01 .96	65.0 3.2
31.9	39.73 .48	42.6 2.8	25.39 .96	38.0 2.3	10.28 .53	23.6 2.8	36.29 .31	62.0 2.8
Feb. 10.8	40.25 .54	40.1 2.2	25.67 .99	35.8 1.9	10.86 .02	21.1 2.3	36.62 .35	59.4 2.3
20.8	40.83 .80	38.1 1.6	25.96 .30	34.1 1.5	11.52 .09	19.0 1.7	36.99 .38	57.3 1.8
Mar. 1.8	41.46 .63	36.8 1.0	26.27 .31	32.9 1.0	12.24 .73	17.6 1.1	37.37 .40	55.8 1.2
11.8	42.10 .64	36.1 -0.3	26.58 .31	32.2 -0.4	12.98 .75	16.9 -0.4	37.78 .40	54.9 -0.5
21.7	42.75 .64	36.1 +0.3	26.89 .31	32.0 +0.1	13.73 .74	16.8 +0.3	38.18 .40	54.7 +0.1
31.7	43.37 .61	36.8 1.0	27.20 .30	32.4 0.6	14.47 .71	17.4 0.9	38.58 .39	55.2 0.7
Apr. 10.7	43.96 .56	38.1 1.6	27.49 .29	33.3 1.1	15.16 .06	18.6 1.5	38.97 .37	56.2 1.3
20.6	44.50 .50	40.0 2.1	27.77 .37	34.6 1.5	15.78 .59	20.4 2.0	39.33 .34	57.9 1.9
30.6	44.96 .43	42.3 2.5	28.03 .94	36.4 1.9	16.33 .50	22.6 2.5	39.65 .31	60.0 2.3
May 10.6	45.35 .34	45.1 2.9	28.26 .92	38.4 2.3	16.79 .40	25.3 2.8	39.94 .36	62.5 2.7
20.6	45.64 .35	48.1 3.1	28.46 .18	40.7 2.4	17.13 .39	28.3 3.1	40.18 .32	65.4 2.9
30.5	45.84 .15	51.3 3.3	28.63 .15	43.2 2.5	17.36 .17	31.4 3.2	40.37 .16	68.4 3.1
June 9.5	45.94 +.04	54.6 3.3	28.76 .11	45.7 2.5	17.47 +.05	34.7 3.3	40.51 .11	71.6 3.2
19.5	45.93 -.06	57.9 3.2	28.85 .07	48.2 2.5	17.46 -.07	36.0 3.2	40.59 +.05	74.8 3.2
29.5	45.82 .16	61.1 3.1	28.90 +.03	50.7 2.4	17.33 .19	41.2 3.1	40.60 -.01	77.9 3.1
July 9.4	45.62 .25	64.1 2.9	28.91 -.01	53.0 2.2	17.07 .31	44.2 2.9	40.56 .07	80.9 2.9
19.4	45.31 .35	66.8 2.6	28.87 .06	55.1 2.0	16.71 .41	47.0 2.6	40.46 .12	83.7 2.6
29.4	44.93 .43	69.2 2.2	28.79 .10	56.9 1.7	16.25 .51	49.4 2.2	40.30 .18	86.2 2.3
Aug. 8.3	44.46 .50	71.2 1.8	28.68 .13	58.5 1.4	15.69 .00	51.4 1.8	40.09 .23	88.3 1.9
18.3	43.93 .56	72.8 1.3	28.53 .16	59.7 1.1	15.05 .67	53.1 1.4	39.83 .26	90.0 1.5
28.3	43.35 .60	73.9 0.9	28.35 .19	60.6 0.7	14.35 .72	54.3 0.9	39.54 .31	91.3 1.1
Sept. 7.3	42.73 .63	74.5 +0.3	28.15 .21	61.1 +0.3	13.61 .76	55.0 +0.4	39.22 .33	92.1 0.6
17.2	42.08 .64	74.6 -0.2	27.94 .21	61.2 -0.1	12.83 .78	55.1 -0.1	38.88 .34	92.4 +0.1
27.2	41.44 .64	74.1 0.7	27.72 .21	61.0 0.5	12.05 .77	54.8 0.6	38.54 .34	92.3 -0.4
Oct. 7.2	40.81 .61	73.2 1.2	27.51 .20	60.3 0.9	11.29 .75	53.9 1.1	38.20 .33	91.6 0.9
17.2	40.21 .57	71.7 1.7	27.32 .18	59.2 1.3	10.56 .70	52.5 1.6	37.88 .31	90.4 1.4
27.1	39.66 .51	69.7 2.2	27.16 .15	57.8 1.6	9.89 .63	50.6 2.1	37.58 .27	88.7 1.9
Nov. 6.1	39.19 .43	67.3 2.7	27.03 .11	56.0 2.0	9.29 .54	48.2 2.6	37.34 .22	86.5 2.4
16.1	38.80 .34	64.4 3.0	26.94 .06	53.8 2.3	8.79 .44	45.4 3.0	37.14 .17	83.9 2.8
26.0	38.50 .24	61.2 3.3	26.90 -.01	51.3 2.6	8.40 .33	42.2 3.3	37.00 .11	81.0 3.1
Dec. 6.0	38.32 .13	57.7 3.6	26.91 +.04	48.6 2.8	8.14 .19	38.8 3.5	36.93 -.04	77.7 3.4
16.0	38.25 -.01	54.0 3.7	26.97 .09	45.7 2.9	8.01 -.06	35.2 3.7	36.92 +.03	74.2 3.5
26.0	38.30 +.11	50.3 3.7	27.09 .13	42.7 3.0	8.03 +.08	31.4 3.7	36.99 .10	70.6 3.6
35.9	38.46 +.22	46.6 -3.6	27.24 +.17	39.8 -3.0	8.18 +.22	27.7 -3.6	37.12 +.16	67.0 -3.5

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\gamma^3$ Sagittarii.		$\mu^1$ Sagittarii.		$\epsilon^2$ Octantis.	
	Right Ascension.	Declination South.	Right Ascension.	Declination South.	Right Ascension.	Declination South.
	<sup>h</sup> <sup>m</sup> 17 57	<sup>°</sup> <sup>'</sup> 30 25	<sup>h</sup> <sup>m</sup> 18 6	<sup>°</sup> <sup>'</sup> 21 5	<sup>h</sup> 18	<sup>°</sup> <sup>'</sup> 89 16
Jan. 2.0	<sup>s</sup> 32.38 +.30	<sup>"</sup> 22.8 -0.2	<sup>s</sup> 3.92 +.18	<sup>"</sup> 24.2 +0.3	<sup>m</sup> <sup>s</sup> 7 35.69 + 7.32	<sup>"</sup> 32.9 -3.1
11.9	32.60 .34	22.6 0.2	4.12 .31	24.5 0.3	7 44.57 10.30	36.8 2.9
21.9	32.86 .27	22.5 -0.1	4.35 .26	24.9 0.4	7 56.38 13.16	34.0 2.6
31.9	33.15 .30	22.4 0.0	4.61 .27	25.2 0.3	8 10.76 15.52	31.6 2.3
Feb. 10.9	33.46 .32	22.5 0.0	4.89 .29	25.5 0.3	8 27.28 17.45	29.5 1.9
20.8	33.79 .34	22.5 +0.1	5.19 .31	25.8 0.3	8 45.51 18.93	27.8 1.4
Mar. 1.8	34.13 .34	22.6 0.1	5.50 .32	26.1 0.2	9 5.00 19.96	26.6 1.9
11.8	34.48 .35	22.7 0.1	5.82 .32	26.2 +0.1	9 25.28 20.53	25.9 -0.5
21.7	34.82 .35	22.8 0.1	6.14 .32	26.3 0.0	9 45.92 20.64	25.6 0.0
31.7	35.17 .34	22.9 0.1	6.47 .32	26.3 -0.1	10 6.44 20.33	25.9 +0.5
Apr. 10.7	35.51 .33	23.0 0.1	6.78 .31	26.2 0.1	10 26.47 19.64	26.6 1.0
20.7	35.83 .32	23.2 0.2	7.09 .30	26.0 0.2	10 45.61 18.54	27.8 1.4
30.6	36.14 .30	23.4 0.2	7.38 .28	25.8 0.2	11 3.44 17.04	29.5 1.8
May 10.6	36.44 .28	23.6 0.2	7.66 .28	25.5 0.2	11 19.60 15.22	31.5 2.2
20.6	36.70 .25	23.9 0.3	7.91 .24	25.3 0.2	11 33.79 13.06	33.9 2.5
30.6	36.94 .22	24.2 0.4	8.14 .21	25.1 0.2	11 45.67 10.85	36.6 2.8
June 9.5	37.14 .18	24.6 0.4	8.33 .18	24.9 0.1	11 55.01 7.96	39.5 3.0
19.5	37.30 .14	25.1 0.5	8.49 .14	24.8 -0.1	12 1.57 5.12	42.6 3.1
29.5	37.42 .09	25.6 0.5	8.61 .10	24.7 0.0	12 5.21 + 2.13	45.7 3.2
July 9.4	37.49 +0.5	26.2 0.6	8.69 .06	24.7 0.0	12 5.80 - 0.94	48.9 3.1
19.4	37.52 .00	26.8 0.6	8.72 +0.1	24.8 +0.1	12 3.34 3.96	52.0 3.0
29.4	37.50 -0.4	27.3 0.6	8.71 -0.3	24.9 0.1	11 57.94 6.24	54.8 2.8
Aug. 8.4	37.43 .09	27.9 0.5	8.65 .07	25.1 0.2	11 49.71 9.55	57.5 2.4
18.3	37.33 .12	28.4 0.5	8.56 .11	25.3 0.2	11 38.95 11.89	59.7 2.1
28.3	37.18 .16	28.8 0.4	8.44 .14	25.5 0.2	11 26.06 13.24	61.6 1.6
Sept. 7.3	37.01 .18	29.2 0.3	8.28 .16	25.6 0.1	11 11.43 15.22	62.9 1.1
17.3	36.83 .19	29.4 +0.1	8.11 .17	25.8 0.1	10 55.68 16.15	63.7 +0.5
27.2	36.64 .19	29.4 0.0	7.94 .18	25.9 +0.1	10 39.32 16.40	63.9 -0.1
Oct. 7.2	36.45 .18	29.4 -0.1	7.76 .17	25.9 0.0	10 23.09 15.96	63.6 0.7
17.2	36.28 .16	29.2 0.2	7.60 .15	25.9 0.0	10 7.61 14.67	62.6 1.3
27.1	36.14 .12	28.9 0.3	7.47 .12	25.9 0.0	9 53.54 13.15	61.0 1.8
Nov. 6.1	36.03 .08	28.5 0.4	7.37 .08	25.9 0.0	9 41.49 10.26	58.9 2.2
16.1	35.97 -0.3	28.0 0.5	7.31 -0.4	25.9 0.0	9 31.98 8.14	56.4 2.7
26.1	35.97 +0.2	27.6 0.5	7.29 +0.1	26.0 +0.1	9 25.39 4.99	53.6 3.0
Dec. 6.0	36.01 .07	27.1 0.4	7.33 .06	26.0 0.1	9 22.08 - 1.62	50.5 3.2
16.0	36.11 .13	26.7 0.4	7.41 .11	26.2 0.2	9 22.17 + 1.81	47.3 3.2
26.0	36.26 .17	26.3 0.3	7.54 .15	26.4 0.2	9 25.71 5.23	44.0 3.2
36.0	36.46 +.22	26.1 -0.2	7.72 +.19	26.7 +0.3	9 32.58 + 8.41	40.8 -3.0

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\eta$ Serpentis.		$\epsilon$ Aquilæ.		$\alpha$ Lyræ. (Vega.)		$\beta$ Lyræ.	
	Right Ascension.	Declination South.	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	<sup>h</sup> 18 <sup>m</sup> 14	<sup>°</sup> 2 <sup>'</sup> 55	<sup>h</sup> 18 <sup>m</sup> 28	<sup>°</sup> 8 <sup>'</sup> 19	<sup>h</sup> 18 <sup>m</sup> 32	<sup>°</sup> 38 <sup>'</sup> 39	<sup>h</sup> 18 <sup>m</sup> 45	<sup>°</sup> 33 <sup>'</sup> 12
Jan. 2.0	38.78 +.15	49.4 +1.4	12.01 +.14	55.1 +1.0	33.88 +.10	53.4 -3.2	18.89 +.09	52.4 -3.0
11.9	38.95 .18	50.8 1.4	12.17 .18	56.0 1.0	34.00 .15	50.2 3.2	19.00 .13	49.3 3.0
21.9	39.15 .21	52.2 1.3	12.36 .21	57.0 1.0	34.17 .19	47.1 3.0	19.15 .17	46.4 2.8
31.9	39.38 .23	53.4 1.2	12.59 .24	58.0 0.9	34.38 .23	44.2 2.7	19.35 .21	43.6 2.6
Feb. 10.9	39.63 .26	54.5 1.0	12.84 .26	58.8 0.7	34.63 .27	41.6 2.4	19.58 .25	41.2 2.3
20.8	39.90 .28	55.4 0.8	13.10 .27	59.4 0.6	34.91 .29	39.4 1.9	19.84 .27	39.1 1.9
Mar. 1.8	40.18 .29	56.1 0.5	13.39 .29	59.9 0.4	35.22 .32	37.8 1.4	20.12 .28	37.5 1.4
11.8	40.48 .29	56.5 +0.3	13.68 .30	60.2 +0.2	35.54 .33	36.7 0.8	20.43 .31	36.3 0.8
21.8	40.77 .29	56.7 0.0	13.98 .30	60.2 -0.1	35.88 .34	36.2 -0.2	20.74 .32	35.8 -0.3
31.7	41.07 .29	56.6 -0.3	14.28 .30	60.0 0.3	36.22 .34	36.3 +0.4	21.07 .32	35.8 +0.3
Apr. 10.7	41.36 .29	56.2 0.5	14.58 .30	59.6 0.5	36.55 .33	37.0 1.0	21.39 .32	36.4 0.8
20.7	41.64 .28	55.5 0.7	14.87 .29	59.1 0.6	36.88 .32	38.2 1.5	21.70 .31	37.5 1.4
30.6	41.91 .26	54.7 0.9	15.16 .28	58.3 0.8	37.19 .30	40.0 1.9	22.01 .29	39.1 1.8
May 10.6	42.17 .24	53.7 1.1	15.43 .26	57.5 0.9	37.48 .27	42.1 2.3	22.29 .27	41.1 2.2
20.6	42.40 .22	52.6 1.1	15.68 .24	56.5 1.0	37.74 .24	44.6 2.6	22.55 .24	43.5 2.5
30.6	42.62 .20	51.4 1.2	15.91 .21	55.6 1.0	37.96 .20	47.4 2.8	22.78 .21	46.1 2.7
June 9.5	42.80 .16	50.2 1.2	16.11 .18	54.6 0.9	38.14 .16	50.3 3.0	22.98 .17	48.8 2.8
19.5	42.94 .13	49.0 1.1	16.27 .15	53.7 0.9	38.28 .11	53.3 3.0	23.13 .13	51.7 2.8
29.5	43.05 .09	47.9 1.1	16.40 .11	52.8 0.8	38.37 .06	56.3 3.0	23.24 .09	54.5 2.8
July 9.5	43.13 .05	46.9 1.0	16.49 .07	52.0 0.7	38.41 +.01	59.2 2.8	23.30 +.04	57.3 2.7
19.4	43.15 +.01	46.0 0.8	16.53 +.02	51.4 0.6	38.40 -.03	62.0 2.6	23.32 -.01	60.0 2.6
29.4	43.14 -.03	45.2 0.7	16.54 -.02	50.8 0.5	38.34 -.08	64.5 2.4	23.28 -.06	62.4 2.3
Aug. 8.4	43.09 .07	44.6 0.6	16.50 .06	50.4 0.4	38.23 .13	66.8 2.1	23.21 .10	64.6 2.0
18.3	43.00 .10	44.1 0.4	16.42 .09	50.1 0.3	38.08 .17	68.7 1.7	23.08 .14	66.5 1.7
28.3	42.88 .13	43.7 0.3	16.31 .12	49.9 0.1	37.89 .20	70.3 1.4	22.92 .18	68.1 1.4
Sept. 7.3	42.74 .15	43.5 -0.1	16.18 .15	49.8 -0.1	37.67 .23	71.4 0.9	22.73 .20	69.2 1.0
17.3	42.57 .17	43.4 0.0	16.02 .16	49.8 0.0	37.43 .25	72.2 0.5	22.52 .22	70.0 0.6
27.2	42.40 .17	43.5 +0.2	15.85 .17	49.9 +0.1	37.18 .26	72.5 +0.1	22.29 .23	70.4 +0.2
Oct. 7.2	42.24 .16	43.8 0.3	15.68 .16	50.1 0.2	36.92 .25	72.3 -0.4	22.05 .23	70.3 -0.3
17.2	42.08 .15	44.1 0.4	15.52 .15	50.4 0.3	36.67 .24	71.6 0.9	21.83 .22	69.8 0.7
27.2	41.94 .12	44.7 0.6	15.38 .12	50.7 0.4	36.44 .21	70.5 1.3	21.62 .20	68.9 1.1
Nov. 6.1	41.83 .09	45.3 0.8	15.27 .09	51.2 0.5	36.24 .18	69.0 1.8	21.43 .17	67.5 1.6
16.1	41.77 .05	46.2 0.9	15.20 .06	51.8 0.6	36.08 .14	67.0 2.2	21.28 .13	65.7 2.0
26.1	41.74 -.01	47.1 0.9	15.16 -.01	52.5 0.7	35.96 .09	64.6 2.5	21.17 .09	63.6 2.3
Dec. 6.0	41.75 +.04	48.3 1.0	15.17 +.03	53.2 0.8	35.89 -.04	61.9 2.8	21.10 -.04	61.1 2.6
16.0	41.82 .08	49.5 1.2	15.23 .08	54.1 0.9	35.88 +.01	58.9 3.1	21.09 +.01	58.4 2.8
26.0	41.92 .13	50.8 1.3	15.32 .12	55.1 1.0	35.92 .06	55.8 3.2	21.12 .06	55.5 3.0
36.0	42.07 +.17	52.2 +1.4	15.46 +.16	56.0 +1.0	36.01 +.11	52.6 -3.2	21.21 +.11	52.5 -3.0

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	σ Sagittarii.			*50 Draconis.		ζ Aquilæ.		δ Sagittarii.	
	Right Ascension	Declination South.		Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination South.
	<sup>h</sup> <sup>m</sup> 18 47	<sup>°</sup> <sup>'</sup> 26 27		<sup>h</sup> <sup>m</sup> 18 50	<sup>°</sup> <sup>'</sup> 75 16	<sup>h</sup> <sup>m</sup> 18 59	<sup>°</sup> <sup>'</sup> 13 40	<sup>h</sup> <sup>m</sup> 19 10	<sup>°</sup> <sup>'</sup> 19 10
Jan. 2.0	16.96 +.14	14.1 -0.2		24.52 -0.06	51.0 -3.6	29.25 +.09	27.0 -2.1	6.11 +.11	44.2 +0.1
12.0	17.12 .18	13.9 0.2		24.53 +.09	47.3 3.6	29.36 .13	24.8 2.1	6.24 .15	44.3 0.2
21.9	17.32 .29	13.7 0.2		24.70 .25	43.8 3.5	29.51 .16	22.8 2.0	6.41 .18	44.5 0.1
31.9	17.56 .25	13.5 0.2		25.03 .41	40.4 3.2	29.69 .20	20.8 1.8	6.61 .22	44.6 +0.1
Feb. 10.9	17.82 .28	13.3 0.2		25.51 .54	37.4 2.9	29.90 .22	19.1 1.6	6.84 .24	44.6 0.0
20.9	18.11 .30	13.1 0.2		26.12 .66	34.7 2.4	30.14 .25	17.6 1.3	7.09 .26	44.6 -0.1
Mar. 1.8	18.41 .31	12.9 0.2		26.83 .76	32.5 1.8	30.39 .27	16.5 0.9	7.36 .28	44.5 0.2
11.8	18.73 .32	12.6 0.3		27.64 .83	31.0 1.2	30.67 .28	15.7 0.5	7.66 .30	44.3 0.3
21.8	19.06 .33	12.3 0.3		28.49 .86	30.1 -0.6	30.95 .29	15.4 -0.1	7.96 .31	43.9 0.4
31.8	19.30 .33	11.9 0.3		29.36 .87	29.8 +0.1	31.24 .29	15.5 +0.3	8.27 .32	43.4 0.5
Apr. 10.7	19.73 .33	11.6 0.4		30.23 .85	30.2 0.7	31.54 .30	16.1 0.7	8.59 .32	42.9 0.6
20.7	20.06 .33	11.2 0.4		31.07 .81	31.2 1.3	31.83 .32	17.0 1.1	8.91 .32	42.2 0.7
30.7	20.39 .32	10.8 0.3		31.85 .73	32.8 1.9	32.12 .28	18.2 1.4	9.23 .31	41.5 0.7
May 10.6	20.70 .30	10.5 0.3		32.54 .64	34.9 2.3	32.40 .27	19.8 1.7	9.53 .30	40.8 0.7
20.6	20.99 .28	10.2 0.2		33.13 .53	37.5 2.7	32.66 .25	21.6 1.9	9.83 .28	40.1 0.7
30.6	21.26 .26	10.0 -0.1		33.60 .40	40.4 3.0	32.89 .22	23.6 2.0	10.10 .26	39.4 0.6
June 9.6	21.51 .22	9.9 0.0		33.93 .26	43.5 3.2	33.10 .19	25.7 2.1	10.35 .23	38.8 0.5
19.5	21.71 .19	10.0 +0.1		34.12 +.12	46.9 3.3	33.28 .16	27.9 2.1	10.56 .20	38.3 0.5
29.5	21.88 .14	10.1 0.2		34.17 -0.03	50.2 3.4	33.42 .12	30.0 2.1	10.74 .16	37.9 0.3
July 9.5	22.00 .10	10.3 0.3		34.06 .18	53.6 3.3	33.51 .08	32.0 2.0	10.88 .11	37.6 0.2
19.5	22.07 +.05	10.7 0.4		33.81 .32	56.8 3.2	33.57 +.03	33.9 1.8	10.97 .07	37.5 -0.1
29.4	22.10 .00	11.0 0.4		33.42 .45	59.9 2.9	33.58 -0.01	35.7 1.6	11.01 +.02	37.4 0.0
Aug. 8.4	22.06 -0.04	11.5 0.5		32.90 .58	62.7 2.6	33.55 .05	37.2 1.4	11.01 -0.02	37.5 +0.1
18.4	22.01 .09	12.0 0.5		32.26 .69	65.2 2.3	33.48 .09	38.5 1.2	10.97 .06	37.7 0.2
28.3	21.91 .12	12.5 0.5		31.52 .78	67.3 1.9	33.37 .12	39.6 0.9	10.88 .10	37.9 0.2
Sept. 7.3	21.77 .15	12.9 0.4		30.70 .86	69.0 1.5	33.23 .15	40.4 0.7	10.76 .13	38.2 0.3
17.3	21.61 .17	13.3 0.3		29.81 .91	70.2 1.0	33.07 .17	40.9 0.4	10.62 .15	38.5 0.3
27.3	21.42 .18	13.6 0.3		28.87 .94	71.0 +0.5	32.89 .18	41.1 +0.1	10.45 .17	38.7 0.3
Oct. 7.2	21.24 .18	13.8 0.2		27.92 .95	71.2 0.0	32.71 .18	41.1 -0.2	10.28 .17	39.0 0.3
17.2	21.06 .17	13.9 +0.1		26.97 .94	70.9 -0.6	32.53 .17	40.7 0.5	10.11 .16	39.3 0.2
27.2	20.91 .14	14.0 0.0		26.04 .89	70.0 1.1	32.37 .15	40.1 0.8	9.96 .15	39.5 0.2
Nov. 6.2	20.78 .11	13.9 -0.1		25.18 .83	68.6 1.7	32.22 .13	39.1 1.1	9.82 .12	39.7 0.2
16.1	20.68 .07	13.7 0.2		24.39 .73	66.7 2.1	32.11 .08	37.9 1.3	9.72 .08	39.9 0.2
26.1	20.63 -0.03	13.5 0.2		23.71 .62	64.3 2.6	32.04 .06	36.4 1.6	9.66 -0.04	40.0 0.2
Dec. 6.1	20.63 +.02	13.3 0.2		23.15 .49	62.5 3.0	32.00 -0.02	34.7 1.8	9.63 .00	40.2 0.2
16.0	20.67 .07	13.1 0.2		22.73 .34	58.4 3.3	32.00 +.03	32.8 2.0	9.65 +.04	40.4 0.2
26.0	20.77 .12	12.8 0.2		22.47 .18	55.0 3.5	32.05 .07	30.8 2.1	9.72 .09	40.5 0.2
36.0	20.91 +.16	12.6 -0.2		22.37 -0.02	51.4 -3.6	32.14 +.11	28.6 -2.1	9.83 +.13	40.7 +0.2



## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	* $\delta$ Draconis.		$\tau^*$ Draconis.		$\delta$ Aquilæ.		$\kappa$ Aquilæ.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination South.
	<sup>h</sup> 19 <sup>m</sup> 12	<sup>°</sup> 67 <sup>'</sup> 25	<sup>h</sup> 19 <sup>m</sup> 17	<sup>°</sup> 73 <sup>'</sup> 6	<sup>h</sup> 19 <sup>m</sup> 19	<sup>°</sup> 2 <sup>'</sup> 51	<sup>h</sup> 19 <sup>m</sup> 29	<sup>°</sup> 7 <sup>'</sup> 18
Jan. 2.0	27.60 <sup>s</sup> - .06	69.2 <sup>s</sup> - 3.6	55.68 <sup>s</sup> - .14	60.3 <sup>s</sup> - 3.5	0.29 <sup>s</sup> + .06	37.6 <sup>s</sup> - 1.5	57.85 <sup>s</sup> + .06	39.9 <sup>s</sup> + 0.8
12.0	27.59 <sup>s</sup> + .05	65.6 <sup>s</sup> 3.6	55.61 <sup>s</sup> .00	56.8 <sup>s</sup> 3.6	0.39 <sup>s</sup> .12	36.9 <sup>s</sup> 1.5	57.95 <sup>s</sup> .12	40.7 <sup>s</sup> 0.8
22.0	27.69 <sup>s</sup> .15	62.0 <sup>s</sup> 3.5	55.68 <sup>s</sup> + .14	53.9 <sup>s</sup> 3.5	0.53 <sup>s</sup> .15	34.7 <sup>s</sup> 1.4	58.09 <sup>s</sup> .15	41.5 <sup>s</sup> 0.8
31.9	27.89 <sup>s</sup> .25	58.6 <sup>s</sup> 3.3	55.90 <sup>s</sup> .26	49.7 <sup>s</sup> 3.3	0.70 <sup>s</sup> .19	33.4 <sup>s</sup> 1.3	58.25 <sup>s</sup> .16	42.3 <sup>s</sup> 0.7
Feb. 10.9	28.20 <sup>s</sup> .35	55.4 <sup>s</sup> 3.0	56.25 <sup>s</sup> .41	46.5 <sup>s</sup> 3.0	0.90 <sup>s</sup> .21	32.2 <sup>s</sup> 1.1	58.45 <sup>s</sup> .21	42.9 <sup>s</sup> 0.5
20.9	28.59 <sup>s</sup> .43	52.6 <sup>s</sup> 2.6	56.72 <sup>s</sup> .52	43.6 <sup>s</sup> 2.6	1.13 <sup>s</sup> .23	31.2 <sup>s</sup> 0.8	58.67 <sup>s</sup> .23	43.3 <sup>s</sup> 0.4
Mar. 1.9	29.05 <sup>s</sup> .50	50.3 <sup>s</sup> 2.1	57.29 <sup>s</sup> .62	41.2 <sup>s</sup> 2.1	1.37 <sup>s</sup> .25	30.5 <sup>s</sup> 0.6	58.92 <sup>s</sup> .25	43.6 <sup>s</sup> + 0.2
11.8	29.58 <sup>s</sup> .55	48.5 <sup>s</sup> 1.5	57.95 <sup>s</sup> .69	39.4 <sup>s</sup> 1.6	1.63 <sup>s</sup> .27	30.1 <sup>s</sup> - 0.3	59.18 <sup>s</sup> .27	43.7 <sup>s</sup> - 0.1
21.8	30.15 <sup>s</sup> .58	47.3 <sup>s</sup> 0.8	58.67 <sup>s</sup> .74	38.1 <sup>s</sup> 0.9	1.91 <sup>s</sup> .28	30.0 <sup>s</sup> + 0.1	59.46 <sup>s</sup> .28	43.5 <sup>s</sup> 0.3
31.8	30.75 <sup>s</sup> .60	46.8 <sup>s</sup> - 0.2	59.44 <sup>s</sup> .77	37.5 <sup>s</sup> - 0.3	2.20 <sup>s</sup> .29	30.2 <sup>s</sup> 0.4	59.75 <sup>s</sup> .29	43.1 <sup>s</sup> 0.5
Apr. 10.8	31.35 <sup>s</sup> .60	47.0 <sup>s</sup> + 0.5	60.21 <sup>s</sup> .77	37.6 <sup>s</sup> + 0.4	2.49 <sup>s</sup> .29	30.8 <sup>s</sup> 0.7	60.05 <sup>s</sup> .30	42.4 <sup>s</sup> 0.7
20.7	31.94 <sup>s</sup> .58	47.8 <sup>s</sup> 1.1	60.97 <sup>s</sup> .74	38.3 <sup>s</sup> 1.0	2.79 <sup>s</sup> .30	31.6 <sup>s</sup> 1.0	60.35 <sup>s</sup> .30	41.6 <sup>s</sup> 0.9
30.7	32.51 <sup>s</sup> .54	49.2 <sup>s</sup> 1.7	61.69 <sup>s</sup> .69	39.6 <sup>s</sup> 1.6	3.06 <sup>s</sup> .29	32.7 <sup>s</sup> 1.3	60.66 <sup>s</sup> .30	40.6 <sup>s</sup> 1.1
May 10.7	33.03 <sup>s</sup> .49	51.2 <sup>s</sup> 2.2	62.36 <sup>s</sup> .63	41.5 <sup>s</sup> 2.1	3.37 <sup>s</sup> .28	34.1 <sup>s</sup> 1.4	60.95 <sup>s</sup> .29	39.4 <sup>s</sup> 1.2
20.6	33.50 <sup>s</sup> .49	53.6 <sup>s</sup> 2.6	62.95 <sup>s</sup> .54	43.8 <sup>s</sup> 2.5	3.64 <sup>s</sup> .28	35.6 <sup>s</sup> 1.6	61.24 <sup>s</sup> .28	38.2 <sup>s</sup> 1.2
30.6	33.89 <sup>s</sup> .35	56.5 <sup>s</sup> 3.0	63.44 <sup>s</sup> .44	46.6 <sup>s</sup> 2.9	3.90 <sup>s</sup> .24	37.2 <sup>s</sup> 1.6	61.51 <sup>s</sup> .26	37.0 <sup>s</sup> 1.3
June 9.6	34.20 <sup>s</sup> .27	59.6 <sup>s</sup> 3.2	63.83 <sup>s</sup> .33	49.6 <sup>s</sup> 3.2	4.13 <sup>s</sup> .21	38.9 <sup>s</sup> 1.7	61.76 <sup>s</sup> .23	35.7 <sup>s</sup> 1.2
19.6	34.42 <sup>s</sup> .17	62.9 <sup>s</sup> 3.4	64.09 <sup>s</sup> .20	52.9 <sup>s</sup> 3.3	4.33 <sup>s</sup> .18	40.6 <sup>s</sup> 1.7	61.97 <sup>s</sup> .20	34.5 <sup>s</sup> 1.2
29.5	34.54 <sup>s</sup> + .06	66.3 <sup>s</sup> 3.4	64.23 <sup>s</sup> + .06	56.3 <sup>s</sup> 3.4	4.49 <sup>s</sup> .14	42.2 <sup>s</sup> 1.6	62.16 <sup>s</sup> .16	33.3 <sup>s</sup> 1.1
July 9.5	34.57 <sup>s</sup> - .02	69.8 <sup>s</sup> 3.4	64.24 <sup>s</sup> - .06	59.8 <sup>s</sup> 3.4	4.62 <sup>s</sup> .10	43.8 <sup>s</sup> 1.5	62.30 <sup>s</sup> .12	32.3 <sup>s</sup> 1.0
19.5	34.50 <sup>s</sup> .12	73.2 <sup>s</sup> 3.3	64.12 <sup>s</sup> .18	63.2 <sup>s</sup> 3.3	4.70 <sup>s</sup> .06	45.2 <sup>s</sup> 1.4	62.40 <sup>s</sup> .08	31.4 <sup>s</sup> 0.8
29.5	34.33 <sup>s</sup> .28	76.4 <sup>s</sup> 3.1	63.88 <sup>s</sup> .31	66.4 <sup>s</sup> 3.2	4.74 <sup>s</sup> + .02	46.5 <sup>s</sup> 1.2	62.45 <sup>s</sup> + .03	30.6 <sup>s</sup> 0.7
Aug. 8.4	34.07 <sup>s</sup> .31	79.4 <sup>s</sup> 2.9	63.51 <sup>s</sup> .42	69.5 <sup>s</sup> 2.9	4.74 <sup>s</sup> - .02	47.6 <sup>s</sup> 1.0	62.47 <sup>s</sup> - .01	30.1 <sup>s</sup> 0.5
18.4	33.72 <sup>s</sup> .30	82.2 <sup>s</sup> 2.6	63.03 <sup>s</sup> .53	72.3 <sup>s</sup> 2.6	4.69 <sup>s</sup> .06	48.5 <sup>s</sup> 0.8	62.44 <sup>s</sup> .05	29.6 <sup>s</sup> 0.4
28.4	33.29 <sup>s</sup> .46	84.5 <sup>s</sup> 2.2	62.46 <sup>s</sup> .69	74.8 <sup>s</sup> 2.3	4.61 <sup>s</sup> .10	49.3 <sup>s</sup> 0.6	62.37 <sup>s</sup> .09	29.3 <sup>s</sup> 0.2
Sept. 7.3	32.80 <sup>s</sup> .52	86.5 <sup>s</sup> 1.7	61.79 <sup>s</sup> .70	76.8 <sup>s</sup> 1.9	4.49 <sup>s</sup> .13	49.8 <sup>s</sup> 0.4	62.26 <sup>s</sup> .12	29.2 <sup>s</sup> - 0.1
17.3	32.26 <sup>s</sup> .56	88.0 <sup>s</sup> 1.3	61.06 <sup>s</sup> .76	78.5 <sup>s</sup> 1.4	4.35 <sup>s</sup> .15	50.1 <sup>s</sup> + 0.2	62.13 <sup>s</sup> .14	29.1 <sup>s</sup> 0.0
27.3	31.68 <sup>s</sup> .59	89.1 <sup>s</sup> 0.8	60.28 <sup>s</sup> .80	79.6 <sup>s</sup> 0.9	4.19 <sup>s</sup> .16	50.2 <sup>s</sup> 0.0	61.98 <sup>s</sup> .16	29.2 <sup>s</sup> + 0.1
Oct. 7.3	31.08 <sup>s</sup> .60	89.6 <sup>s</sup> + 0.3	59.46 <sup>s</sup> .82	80.3 <sup>s</sup> + 0.4	4.03 <sup>s</sup> .17	50.1 <sup>s</sup> - 0.2	61.82 <sup>s</sup> .16	29.4 <sup>s</sup> 0.2
17.2	30.48 <sup>s</sup> .60	89.6 <sup>s</sup> - 0.3	58.64 <sup>s</sup> .82	80.4 <sup>s</sup> - 0.1	3.86 <sup>s</sup> .16	49.9 <sup>s</sup> 0.4	61.65 <sup>s</sup> .16	29.7 <sup>s</sup> 0.3
27.2	29.89 <sup>s</sup> .57	89.0 <sup>s</sup> 0.8	57.83 <sup>s</sup> .79	80.0 <sup>s</sup> 0.7	3.71 <sup>s</sup> .15	49.4 <sup>s</sup> 0.6	61.50 <sup>s</sup> .14	30.1 <sup>s</sup> 0.4
Nov. 6.2	29.33 <sup>s</sup> .53	87.9 <sup>s</sup> 1.4	57.06 <sup>s</sup> .75	79.0 <sup>s</sup> 1.3	3.57 <sup>s</sup> .19	48.7 <sup>s</sup> 0.8	61.36 <sup>s</sup> .19	30.6 <sup>s</sup> 0.5
16.2	28.82 <sup>s</sup> .48	86.3 <sup>s</sup> 1.9	56.34 <sup>s</sup> .68	77.5 <sup>s</sup> 1.8	3.46 <sup>s</sup> .09	47.9 <sup>s</sup> 0.9	61.25 <sup>s</sup> .09	31.1 <sup>s</sup> 0.6
26.1	28.37 <sup>s</sup> .41	84.1 <sup>s</sup> 2.4	55.70 <sup>s</sup> .59	75.4 <sup>s</sup> 2.3	3.38 <sup>s</sup> .06	46.9 <sup>s</sup> 1.1	61.18 <sup>s</sup> .06	31.7 <sup>s</sup> 0.7
Dec. 6.1	28.01 <sup>s</sup> .32	81.5 <sup>s</sup> 2.8	55.16 <sup>s</sup> .48	72.9 <sup>s</sup> 2.7	3.35 <sup>s</sup> - .02	45.7 <sup>s</sup> 1.2	61.14 <sup>s</sup> - .02	32.5 <sup>s</sup> 0.7
16.1	27.73 <sup>s</sup> .23	78.5 <sup>s</sup> 3.2	54.73 <sup>s</sup> .36	70.0 <sup>s</sup> 3.1	3.35 <sup>s</sup> + .02	44.4 <sup>s</sup> 1.3	61.14 <sup>s</sup> + .02	33.2 <sup>s</sup> 0.8
26.0	27.55 <sup>s</sup> .13	75.2 <sup>s</sup> 3.4	54.44 <sup>s</sup> .23	66.8 <sup>s</sup> 3.3	3.39 <sup>s</sup> .06	43.0 <sup>s</sup> 1.4	61.18 <sup>s</sup> .06	34.0 <sup>s</sup> 0.8
36.0	27.47 <sup>s</sup> - .02	71.7 <sup>s</sup> - 3.6	54.27 <sup>s</sup> - .02	63.3 <sup>s</sup> - 3.5	3.47 <sup>s</sup> + .10	41.5 <sup>s</sup> - 1.5	61.25 <sup>s</sup> + .09	34.9 <sup>s</sup> + 0.8

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\gamma$ Aquilæ.		$\alpha$ Aquilæ. (Altair.)		$\epsilon$ Draconis.		$\beta$ Aquilæ.	
	Right Ascension.	Declination North.	Right Ascension	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	<sup>h</sup> 19 <sup>m</sup> 40	<sup>°</sup> 10 <sup>'</sup> 17	<sup>h</sup> 19 <sup>m</sup> 44	<sup>°</sup> 8 <sup>'</sup> 31	<sup>h</sup> 19 <sup>m</sup> 48	<sup>°</sup> 69 <sup>'</sup> 56	<sup>h</sup> 19 <sup>m</sup> 48	<sup>°</sup> 6 <sup>'</sup> 5
Jan. 2.0	8.17 +.06	67.1 -1.8	29.98 +.05	51.2 -1.7	31.78 -1.18	30.5 -3.3	59.24 +.05	15.4 -1.6
12.0	8.25 .09	65.3 1.8	30.05 .09	49.5 1.7	31.66 -.08	27.0 3.5	59.31 .09	13.8 1.6
22.0	8.36 .13	63.5 1.7	30.16 .13	47.8 1.6	31.65 +.05	23.5 3.5	59.42 .19	12.3 1.5
Feb. 1.0	8.50 .16	61.8 1.6	30.30 .16	46.2 1.5	31.77 .17	20.0 3.4	59.56 .15	10.8 1.4
10.9	8.68 .19	60.2 1.4	30.48 .19	44.8 1.3	32.00 .98	16.7 3.2	59.73 .18	9.5 1.2
20.9	8.88 .22	58.9 1.2	30.68 .21	43.6 1.1	32.34 .39	13.6 2.8	59.93 .21	8.4 1.0
Mar. 1.9	9.11 .24	57.9 0.8	30.91 .24	42.6 0.8	32.77 .48	11.0 2.4	60.15 .22	7.5 0.7
11.9	9.36 .26	57.3 0.5	31.15 .26	42.1 -0.4	33.29 .55	8.8 1.9	60.39 .25	7.0 -0.3
21.8	9.63 .27	57.0 -0.1	31.42 .27	41.8 0.0	33.88 .61	7.3 1.3	60.65 .27	6.8 0.0
31.8	9.91 .29	57.1 +0.3	31.70 .29	42.0 +0.3	34.51 .65	6.3 -0.6	60.93 .28	7.0 +0.4
Apr. 10.8	10.20 .29	57.6 0.7	31.99 .30	42.5 0.7	35.17 .66	6.0 0.0	61.22 .29	7.6 0.7
20.7	10.50 .30	58.5 1.0	32.29 .30	43.4 1.0	35.83 .66	6.4 +0.7	61.52 .30	8.4 1.0
30.7	10.80 .30	59.7 1.3	32.59 .30	44.6 1.3	36.48 .63	7.3 1.3	61.82 .30	9.6 1.3
May 10.7	11.09 .29	61.2 1.6	32.88 .29	46.1 1.6	37.10 .59	8.9 1.8	62.11 .29	11.0 1.5
20.7	11.37 .27	62.9 1.8	33.17 .28	47.8 1.8	37.67 .53	11.0 2.3	62.40 .28	12.6 1.7
30.6	11.63 .25	64.8 2.0	33.44 .26	49.6 1.9	38.16 .46	13.6 2.7	62.67 .26	14.4 1.8
June 9.6	11.88 .22	66.8 2.0	33.68 .23	51.6 2.0	38.58 .37	16.5 3.1	62.92 .22	16.2 1.9
19.6	12.09 .19	68.9 2.1	33.90 .20	53.6 2.0	38.90 .27	19.7 3.3	63.14 .20	18.1 1.9
29.6	12.26 .16	70.9 2.0	34.08 .16	55.6 2.0	39.12 .17	23.1 3.4	63.33 .17	20.0 1.8
July 9.5	12.40 .12	72.9 1.9	34.23 .12	57.5 1.9	39.23 +.06	26.6 3.5	63.48 .12	21.8 1.7
19.5	12.50 .07	74.8 1.8	34.33 .08	59.3 1.7	39.23 -.05	30.1 3.5	63.59 .00	23.5 1.6
29.5	12.55 +.03	76.6 1.6	34.39 +.04	61.0 1.6	39.13 .16	33.5 3.4	63.65 +.04	25.0 1.4
Aug. 8.4	12.56 -.01	78.1 1.4	34.40 -.01	62.5 1.4	38.91 .26	36.8 3.2	63.67 .00	26.4 1.3
18.4	12.52 .05	79.4 1.2	34.37 .05	63.8 1.2	38.60 .36	39.9 2.9	63.65 -.04	27.5 1.0
28.4	12.45 .09	80.5 1.0	34.31 .09	64.8 0.9	38.19 .45	42.7 2.6	63.58 .06	28.5 0.8
Sept. 7.4	12.34 .12	81.4 0.7	34.20 .12	65.7 0.7	37.70 .53	45.1 2.2	63.48 .11	29.2 0.6
17.3	12.20 .15	82.0 0.5	34.07 .14	66.2 0.5	37.14 .59	47.2 1.8	63.36 .14	29.7 0.4
27.3	12.04 .16	82.4 +0.2	33.92 .16	66.6 +0.2	36.52 .63	48.8 1.3	63.21 .16	30.0 +0.1
Oct. 7.3	11.88 .17	82.5 0.0	33.75 .17	66.7 0.0	35.87 .66	49.9 0.8	63.04 .16	30.0 -0.1
17.3	11.70 .17	82.3 -0.3	33.58 .16	66.5 -0.3	35.20 .67	50.5 +0.3	62.88 .16	29.8 0.3
27.2	11.54 .16	81.9 0.6	33.42 .15	66.1 0.5	34.53 .66	50.5 -0.3	62.72 .15	29.4 0.5
Nov. 6.2	11.39 .14	81.2 0.8	33.28 .14	65.5 0.8	33.87 .63	50.0 0.8	62.57 .14	28.8 0.7
16.2	11.26 .11	80.3 1.1	33.15 .11	64.6 1.0	33.26 .59	48.8 1.4	62.44 .11	27.9 0.9
26.1	11.17 .05	79.1 1.3	33.06 .06	63.5 1.2	32.69 .53	47.2 1.9	62.35 .08	26.9 1.1
Dec. 6.1	11.10 -.04	77.7 1.5	32.99 .04	62.2 1.4	32.20 .45	45.0 2.4	62.29 .04	25.7 1.3
16.1	11.08 .00	76.1 1.6	32.97 -.01	60.8 1.5	31.80 .35	42.4 2.8	62.26 -.01	24.3 1.4
26.1	11.09 +.02	74.4 1.7	32.98 +.02	59.2 1.6	31.49 .25	39.4 3.1	62.27 +.02	22.8 1.5
26.0	11.15 +.07	72.6 -1.8	33.03 +.07	57.5 -1.7	31.30 -1.14	36.1 -3.4	62.32 +.07	21.3 -1.6

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\tau$ Aquilæ.		$\alpha^2$ Capricorni.		$\kappa$ Cephei.		$\alpha$ Pavonis.	
	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination South.
	<sup>h</sup> 19 <sup>m</sup> 57	<sup>°</sup> 6 <sup>'</sup> 54	<sup>h</sup> 20 <sup>m</sup> 10	<sup>°</sup> 12 <sup>'</sup> 56	<sup>h</sup> 20 <sup>m</sup> 13	<sup>°</sup> 77 <sup>'</sup> 19	<sup>h</sup> 20 <sup>m</sup> 15	<sup>°</sup> 57 <sup>'</sup> 8
Jan. 2.0	50.95 +.04	62.3 -1.6	54.68 +.05	30.0 +0.4	4.03 -.45	30.9 -3.1	26.99 +.04	43.4 -2.1
12.0	51.01 .06	60.7 1.6	54.74 .06	30.4 0.4	3.67 .97	27.7 3.3	27.06 .11	41.2 2.3
22.0	51.11 .11	59.1 1.5	54.84 .12	30.7 0.3	3.49 -.06	24.3 3.4	27.20 .17	38.9 2.3
Feb. 1.0	51.24 .14	57.6 1.4	54.97 .15	31.0 0.2	3.50 +.10	20.8 3.4	27.40 .23	36.5 2.4
10.9	51.40 .17	56.3 1.2	55.14 .16	31.1 +0.1	3.70 .29	17.5 3.3	27.67 .28	34.2 2.3
20.9	51.59 .20	55.2 1.0	55.33 .20	31.1 -0.1	4.06 .46	14.3 3.0	27.99 .34	31.9 2.2
Mar. 1.9	51.80 .23	54.4 0.7	55.55 .23	31.0 0.2	4.63 .62	11.4 2.6	28.36 .39	29.7 2.1
11.9	52.04 .25	53.8 -0.4	55.79 .25	30.6 0.4	5.33 .76	9.0 2.2	28.77 .43	27.7 2.0
21.8	52.30 .27	53.6 0.0	56.05 .27	30.1 0.6	6.15 .86	7.1 1.6	29.22 .46	25.8 1.8
31.8	52.58 .28	53.8 +0.3	56.34 .29	29.4 0.8	7.06 .94	5.8 1.0	29.70 .49	24.2 1.5
Apr. 10.8	52.86 .29	54.3 0.7	56.63 .30	28.6 1.0	8.02 .98	5.1 -0.4	30.20 .51	22.8 1.2
20.7	53.16 .30	55.2 1.0	56.94 .31	27.5 1.1	9.02 1.00	5.1 +0.3	30.72 .52	21.7 0.9
30.7	53.46 .30	56.4 1.3	57.25 .31	26.4 1.2	10.01 .97	5.7 0.9	31.25 .53	20.9 0.6
May 10.7	53.76 .29	57.8 1.6	57.57 .31	25.2 1.2	10.95 .91	6.9 1.5	31.78 .52	20.4 -0.3
20.7	54.05 .28	59.5 1.7	57.88 .30	23.9 1.2	11.83 .83	8.6 2.0	32.30 .51	20.3 +0.1
30.6	54.32 .26	61.3 1.9	58.17 .29	22.7 1.2	12.61 .73	10.8 2.5	32.80 .48	20.5 0.4
June 9.6	54.58 .24	63.2 1.9	58.45 .27	21.5 1.2	13.28 .59	13.5 2.8	33.26 .44	21.1 0.7
19.6	54.80 .21	65.2 2.0	58.71 .24	20.4 1.1	13.80 .45	16.5 3.1	33.68 .39	22.0 1.1
29.6	55.00 .17	67.1 1.9	58.93 .20	19.3 0.9	14.17 .29	19.8 3.3	34.05 .34	23.2 1.4
July 9.5	55.15 .14	69.0 1.8	59.12 .16	18.5 0.8	14.38 +.13	23.2 3.5	34.35 .27	24.8 1.6
19.5	55.27 .09	70.8 1.7	59.26 .12	17.8 0.6	14.43 -.04	26.7 3.5	34.59 .19	26.5 1.3
29.5	55.34 .05	72.4 1.5	59.36 .08	17.2 0.5	14.30 .21	30.2 3.5	34.75 .12	28.4 2.0
Aug. 8.4	55.37 +.01	73.8 1.3	59.41 +.03	16.9 0.3	14.01 .37	33.7 3.4	34.83 +.04	30.4 2.1
18.4	55.35 -.04	75.1 1.1	59.42 -.02	16.7 -0.1	13.56 .52	37.0 3.2	34.83 -.04	32.5 2.1
28.4	55.30 .07	76.1 0.9	59.38 .06	16.6 0.0	12.97 .66	40.0 2.9	34.75 .11	34.6 2.0
Sept. 7.4	55.20 .11	76.9 0.7	59.31 .09	16.7 +0.1	12.24 .78	42.8 2.6	34.61 .18	36.5 1.8
17.3	55.08 .13	77.5 0.4	59.20 .12	16.9 0.2	11.40 .89	45.2 2.2	34.40 .23	38.2 1.6
27.3	54.93 .15	77.8 +0.2	59.07 .14	17.2 0.3	10.46 .97	47.2 1.8	34.14 .27	39.7 1.3
Oct. 7.3	54.77 .16	77.9 0.0	58.92 .15	17.5 0.4	9.45 1.04	48.8 1.3	33.85 .30	40.8 0.9
17.3	54.61 .16	77.7 -0.2	58.76 .16	17.9 0.4	8.39 1.07	49.8 0.8	33.54 .31	41.6 0.5
27.2	54.45 .15	77.4 0.5	58.60 .15	18.3 0.4	7.31 1.08	50.3 +0.2	33.23 .30	41.9 +0.1
Nov. 6.2	54.30 .14	76.8 0.7	58.46 .13	18.7 0.4	6.23 1.06	50.3 -0.3	32.93 .28	41.8 -0.3
16.2	54.17 .11	76.0 0.9	58.33 .11	19.2 0.4	5.19 1.01	49.7 0.9	32.66 .25	41.3 0.7
26.1	54.07 .08	75.0 1.1	58.23 .08	19.6 0.4	4.21 .94	48.5 1.5	32.44 .20	40.4 1.1
Dec. 6.1	54.00 .05	73.8 1.3	58.17 .05	20.1 0.4	3.32 .83	46.7 2.0	32.27 .14	39.1 1.5
16.1	53.97 -.01	72.4 1.4	58.14 -.01	20.5 0.4	2.54 .70	44.5 2.5	32.16 -.07	37.4 1.8
26.1	53.97 +.02	70.9 1.5	58.14 +.03	20.9 0.4	1.91 .55	41.8 2.9	32.13 .00	35.5 2.0
36.0	54.01 +.06	69.4 -1.6	58.19 +.06	21.3 +0.4	1.43 -.38	38.8 -3.2	32.16 +.07	33.4 -2.2

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\pi$ Capricorni.		$\epsilon$ Delphini.		*Groombridge 3241.		$\alpha$ Cygni.	
	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	<sup>h</sup> 20 <sup>m</sup> 19	<sup>°</sup> 18 <sup>'</sup> 37	<sup>h</sup> 20 <sup>m</sup> 27	<sup>°</sup> 10 <sup>'</sup> 51	<sup>h</sup> 20 <sup>m</sup> 30	<sup>°</sup> 72 <sup>'</sup> 5	<sup>h</sup> 20 <sup>m</sup> 37	<sup>°</sup> 44 <sup>'</sup> 49
Jan. 2.1	57.14 +.04	53.7 +0.1	3.65 +.01	67.0 -1.7	28.50 -3.3	58.1 -3.0	1.71 -.07	26.8 -2.7
12.0	57.19 .08	53.7 0.0	3.68 .05	65.3 1.7	28.22 .21	53.0 3.2	1.67 -.08	24.0 2.9
22.0	57.29 .11	53.7 -0.1	3.74 .08	63.6 1.6	28.08 -.08	49.6 3.4	1.67 +.03	21.0 3.0
Feb. 1.0	57.42 .14	53.5 0.9	3.84 .11	62.0 1.5	28.06 +.05	46.1 3.4	1.72 .08	17.9 3.0
11.0	57.58 .18	53.3 0.3	3.97 .14	60.5 1.4	28.18 .18	42.8 3.3	1.83 .13	14.9 2.9
20.9	57.77 .20	52.9 0.4	4.13 .18	59.2 1.1	28.43 .31	39.5 3.1	1.98 .18	12.2 2.6
Mar. 1.9	57.99 .22	52.4 0.6	4.32 .20	58.2 0.8	28.79 .42	36.6 2.7	2.18 .22	9.8 2.2
11.9	58.23 .25	51.8 0.7	4.53 .23	57.5 0.5	29.27 .52	34.0 2.3	2.42 .26	7.7 1.8
21.9	58.49 .28	51.0 0.8	4.77 .25	57.2 -0.1	29.84 .61	32.0 1.7	2.71 .30	6.2 1.3
31.8	58.78 .29	50.1 1.0	5.04 .27	57.2 +0.2	30.48 .67	30.6 1.1	3.02 .33	5.2 0.7
Apr. 10.8	59.08 .31	49.1 1.0	5.31 .29	57.6 0.6	31.18 .71	29.7 -0.5	3.37 .35	4.8 -0.1
20.8	59.40 .32	48.0 1.1	5.61 .30	58.5 1.0	31.90 .73	29.5 +0.1	3.73 .37	5.0 +0.5
30.7	59.72 .32	46.9 1.2	5.91 .30	59.6 1.3	32.64 .72	30.0 0.7	4.10 .37	5.8 1.0
May 10.7	60.05 .32	45.7 1.2	6.21 .30	61.1 1.6	33.35 .70	31.0 1.3	4.47 .37	7.1 1.6
20.7	60.37 .32	44.5 1.1	6.51 .29	62.8 1.8	34.03 .65	32.7 1.9	4.83 .35	8.9 2.0
30.7	60.68 .30	43.4 1.1	6.80 .28	64.7 2.0	34.66 .58	34.8 2.4	5.17 .33	11.2 2.4
June 9.6	60.97 .28	42.4 1.0	7.07 .26	66.8 2.1	35.20 .50	37.4 2.8	5.49 .30	13.8 2.8
19.6	61.24 .25	41.5 0.8	7.32 .23	69.0 2.2	35.65 .40	40.4 3.1	5.77 .26	16.7 3.0
29.6	61.48 .22	40.7 0.7	7.54 .20	71.1 2.1	36.00 .29	43.6 3.3	6.01 .21	19.9 3.2
July 9.6	61.68 .18	40.2 0.5	7.72 .16	73.3 2.1	36.24 .18	47.1 3.5	6.19 .16	23.1 3.3
19.5	61.84 .14	39.8 0.3	7.86 .12	75.3 2.0	36.36 +.06	50.6 3.6	6.33 .11	26.4 3.3
29.5	61.95 .09	39.5 -0.1	7.95 .07	77.2 1.8	36.36 -.06	54.2 3.6	6.41 +.05	29.7 3.2
Aug. 8.5	62.01 +.04	39.5 0.0	8.00 +.03	78.9 1.6	36.23 .18	57.7 3.5	6.43 -.01	32.9 3.1
18.4	62.03 .00	39.6 +0.2	8.01 -.02	80.5 1.4	35.99 .30	61.1 3.3	6.39 .06	35.8 2.9
28.4	62.00 -.05	39.8 0.3	7.97 .05	81.8 1.2	35.64 .40	64.3 3.1	6.30 .11	38.6 2.6
Sept. 7.4	61.94 .09	40.2 0.4	7.90 .09	82.9 0.9	35.19 .49	67.3 2.8	6.16 .16	41.0 2.3
17.4	61.83 .12	40.6 0.5	7.79 .12	83.7 0.7	34.65 .58	69.9 2.4	5.98 .20	43.2 1.9
27.3	61.70 .14	41.1 0.5	7.66 .14	84.2 0.4	34.04 .64	72.1 2.0	5.76 .23	44.9 1.5
Oct. 7.3	61.55 .15	41.6 0.5	7.51 .16	84.5 +0.2	33.36 .69	73.8 1.5	5.52 .25	46.2 1.1
17.3	61.39 .16	42.0 0.5	7.35 .16	84.6 -0.1	32.65 .73	75.0 1.0	5.26 .26	47.1 0.6
27.3	61.23 .16	42.5 0.4	7.19 .16	84.3 0.4	31.91 .74	75.8 +0.4	4.99 .26	47.4 +0.1
Nov. 6.2	61.08 .14	42.9 0.4	7.03 .15	83.9 0.6	31.17 .73	75.9 -0.1	4.73 .26	47.3 -0.4
16.2	60.95 .12	43.3 0.3	6.89 .13	83.2 0.8	30.45 .70	75.5 0.7	4.48 .24	46.7 0.9
26.2	60.84 .09	43.6 0.3	6.77 .10	82.2 1.1	29.77 .65	74.5 1.3	4.25 .21	45.5 1.4
Dec. 6.1	60.77 .05	43.8 0.2	6.68 .07	81.0 1.3	29.15 .59	72.9 1.8	4.05 .18	43.9 1.8
16.1	60.73 -.02	44.0 0.1	6.63 .04	79.6 1.4	28.60 .50	70.9 2.3	3.89 .14	41.9 2.2
26.1	60.73 +.02	44.1 +0.1	6.60 -.01	78.1 1.6	28.15 .40	68.3 2.7	3.77 .10	39.5 2.6
36.1	60.77 +.06	44.1 0.0	6.61 +.03	76.5 -1.7	27.80 -.29	65.4 -3.1	3.69 -.05	36.8 -2.8

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\mu$ Aquarii.		$\nu$ Cygni.		*12 Year Cat. 1879.		61 Cygni (pr.)	
	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	<sup>h</sup> 20 <sup>m</sup> 45	<sup>°</sup> 9 <sup>'</sup> 27	<sup>h</sup> 20 <sup>m</sup> 52	<sup>°</sup> 40 <sup>'</sup> 40	<sup>h</sup> 20 <sup>m</sup> 53	<sup>°</sup> 80 <sup>'</sup> 3	<sup>h</sup> 21 <sup>m</sup> 1	<sup>°</sup> 38 <sup>'</sup> 6
Jan. 2.1	42.63 +.01	50.3 +0.5	21.80 -.07	33.3 -2.6	12.93 -.79	79.7 -2.7	7.46 -.06	77.2 -2.3
12.1	42.66 .05	50.8 0.5	21.75 -.03	30.6 2.8	12.94 .58	76.8 3.0	7.41 -.02	74.8 2.5
22.1	42.72 .08	51.2 0.4	21.75 +.02	27.8 2.8	11.77 .35	73.6 3.3	7.41 +.02	72.2 2.6
Feb. 1.0	42.82 .11	51.6 0.3	21.79 .06	24.9 2.8	11.54 -.11	70.3 3.4	7.45 .06	69.5 2.6
11.0	42.94 .14	51.8 +0.2	21.87 .11	22.1 2.7	11.54 +.13	66.9 3.3	7.54 .11	66.9 2.5
21.0	43.10 .17	51.9 0.0	22.00 .15	19.5 2.5	11.79 .37	63.6 3.2	7.67 .15	64.4 2.3
Mar. 1.9	43.28 .20	51.8 -0.2	22.18 .20	17.2 2.1	12.28 .59	60.5 2.9	7.84 .19	62.3 2.0
11.9	43.49 .22	51.5 0.4	22.40 .24	15.2 1.7	12.97 .78	57.8 2.5	8.06 .23	60.5 1.6
21.9	43.73 .25	51.0 0.6	22.65 .27	13.7 1.2	13.84 .95	55.5 2.0	8.31 .27	59.1 1.1
31.9	43.99 .27	50.3 0.8	22.95 .31	12.7 0.7	14.87 1.06	53.7 1.5	8.60 .30	58.2 0.6
Apr. 10.8	44.27 .29	49.3 1.0	23.26 .33	12.3 -0.1	16.01 1.18	52.5 0.9	8.91 .33	57.9 -0.1
20.8	44.56 .30	48.2 1.2	23.60 .35	12.4 +0.4	17.23 1.23	51.9 -0.3	9.25 .34	58.1 +0.5
30.8	44.87 .31	46.9 1.3	23.96 .35	13.1 1.0	18.47 1.24	51.9 +0.3	9.60 .36	58.9 1.0
May 10.8	45.18 .31	45.5 1.4	24.31 .35	14.4 1.5	19.70 1.20	52.6 1.0	9.96 .36	60.1 1.5
20.7	45.50 .31	44.0 1.5	24.66 .34	16.1 1.9	20.88 1.13	53.8 1.6	10.32 .35	61.9 2.0
30.7	45.80 .30	42.5 1.5	25.00 .33	18.2 2.3	21.96 1.02	55.6 2.0	10.66 .33	64.1 2.4
June 9.7	46.10 .28	41.0 1.5	25.32 .30	20.8 2.7	22.92 .89	57.9 2.5	10.99 .31	66.7 2.7
19.6	46.37 .26	39.6 1.4	25.61 .27	23.6 2.9	23.74 .73	60.6 2.9	11.29 .28	69.5 2.9
29.6	46.61 .23	38.3 1.2	25.85 .23	26.6 3.1	24.38 .54	63.6 2.2	11.55 .24	72.5 3.1
July 9.6	46.82 .19	37.1 1.1	26.06 .18	29.8 3.2	24.83 .35	66.9 3.4	11.77 .20	75.7 3.2
19.6	47.00 .15	36.1 0.9	26.21 .13	33.0 3.2	25.07 +.14	70.4 3.5	11.95 .15	78.9 3.2
29.5	47.13 .11	35.3 0.7	26.31 .07	36.2 3.1	25.12 -.06	74.0 3.6	12.07 .10	82.1 3.2
Aug. 8.5	47.21 .06	34.6 0.6	26.36 +.02	39.2 3.0	24.95 .27	77.6 3.6	12.14 +.04	85.2 3.0
18.5	47.25 +.02	34.1 0.4	26.35 -.03	42.2 2.8	24.58 .47	81.1 3.4	12.16 -.01	88.2 2.9
28.5	47.24 -.03	33.9 -0.2	26.29 .06	44.9 2.6	24.01 .66	84.5 3.3	12.13 .05	91.0 2.6
Sept. 7.4	47.19 .06	33.8 0.0	26.19 .13	47.3 2.3	23.27 .83	87.6 3.0	12.05 .10	93.5 2.3
17.4	47.11 .10	33.8 +0.1	26.04 .17	49.4 1.9	22.36 .98	90.5 2.7	11.93 .14	95.6 2.0
27.4	47.00 .12	34.0 0.2	25.86 .20	51.2 1.6	21.30 1.11	93.1 2.4	11.77 .17	97.5 1.6
Oct. 7.3	46.86 .14	34.3 0.3	25.65 .22	52.6 1.1	20.13 1.22	95.3 1.9	11.59 .19	98.9 1.2
17.3	46.72 .15	34.6 0.4	25.42 .23	53.5 0.7	18.86 1.30	97.0 1.4	11.39 .21	100.0 0.8
27.3	46.57 .15	35.1 0.5	25.18 .24	54.0 +0.2	17.53 1.35	98.2 0.9	11.18 .21	100.6 +0.4
Nov. 6.3	46.42 .14	35.6 0.5	24.95 .23	53.9 -0.3	16.16 1.36	98.8 +0.4	10.97 .21	100.7 -0.1
16.2	46.29 .12	36.1 0.5	24.72 .22	53.4 0.7	14.80 1.34	98.9 -0.2	10.76 .20	100.4 0.6
26.2	46.18 .10	36.6 0.6	24.51 .20	52.5 1.2	13.48 1.29	98.4 0.8	10.58 .18	99.6 1.0
Dec. 6.2	46.10 .07	37.2 0.6	24.33 .17	51.1 1.6	12.23 1.19	97.3 1.4	10.41 .15	98.3 1.4
16.2	46.04 .04	37.8 0.6	24.18 .13	49.2 2.0	11.10 1.06	95.6 1.9	10.27 .12	96.7 1.8
26.1	46.02 -.01	38.3 0.5	24.06 .10	47.0 2.4	10.11 .80	93.4 2.4	10.17 .06	94.7 2.2
36.1	46.03 +.03	38.9 +0.5	23.99 -.06	44.5 -2.7	9.29 -.72	90.8 -2.8	10.11 -.04	92.4 -2.4

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ζ Cygni.		α Cephei.		1 Pegasi.		β Aquarii.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination South.
	<sup>h</sup> 21	<sup>m</sup> 7	<sup>h</sup> 21	<sup>m</sup> 15	<sup>h</sup> 21	<sup>m</sup> 16	<sup>h</sup> 21	<sup>m</sup> 24
Jan. 2.1	27.21 -05	70.3 -2.2	28.55 -24	40.9 -2.6	8.04 -04	27.3 -1.7	47.10 -02	66.4 +0.6
12.1	27.17 -02	68.0 2.3	28.34 .17	38.2 2.9	8.02 -01	25.5 1.9	47.10 +01	67.0 0.6
22.1	27.17 +02	65.6 2.4	28.20 .10	35.1 3.1	8.03 +02	23.6 1.9	47.12 .03	67.6 0.5
Feb. 1.0	27.21 .06	63.2 2.4	28.14 -02	31.9 3.3	8.07 .06	21.6 1.9	47.17 .07	68.0 0.4
11.0	27.29 .06	60.9 2.3	28.16 +06	28.6 3.2	8.14 .09	19.8 1.7	47.26 .10	68.4 0.3
21.0	27.40 .13	58.7 2.0	28.26 .14	25.4 3.1	8.25 .13	18.2 1.5	47.37 .13	68.5 +0.1
Mar. 1.9	27.55 .17	56.8 1.7	28.45 .22	22.4 2.8	8.40 .16	16.8 1.3	47.51 .16	68.5 -0.1
11.9	27.74 .21	55.2 1.4	28.71 .30	19.7 2.4	8.57 .19	15.6 0.9	47.69 .19	68.3 0.4
21.9	27.97 .24	54.0 0.9	29.05 .36	17.5 2.0	8.78 .22	14.9 0.5	47.89 .22	67.8 0.6
31.9	28.22 .27	53.3 -0.5	29.44 .42	15.8 1.4	9.02 .25	14.6 -0.1	48.12 .24	67.1 0.8
Apr. 10.8	28.50 .29	53.1 0.0	29.88 .46	14.6 0.8	9.28 .27	14.7 +0.3	48.38 .27	66.1 1.1
20.8	28.81 .31	53.4 +0.5	30.37 .50	14.1 -0.2	9.57 .29	15.2 0.7	48.65 .29	64.9 1.3
30.8	29.13 .33	54.2 1.0	30.87 .51	14.2 +0.4	9.87 .31	16.1 1.1	48.95 .30	63.5 1.5
May 10.8	29.45 .33	55.4 1.5	31.39 .51	14.9 1.0	10.18 .31	17.5 1.5	49.26 .31	62.0 1.6
20.7	29.78 .32	57.1 1.9	31.90 .50	16.1 1.6	10.49 .31	19.1 1.8	49.57 .31	60.4 1.7
30.7	30.10 .31	59.2 2.2	32.39 .47	18.0 2.1	10.81 .30	21.1 2.1	49.89 .31	58.7 1.7
June 9.7	30.41 .28	61.5 2.5	32.85 .43	20.3 2.5	11.10 .29	23.3 2.3	50.19 .30	56.9 1.7
19.6	30.69 .27	64.1 2.7	33.26 .38	23.0 2.9	11.38 .27	25.7 2.4	50.48 .28	55.2 1.6
29.6	30.94 .23	66.9 2.8	33.61 .32	26.1 3.2	11.64 .24	28.2 2.5	50.75 .25	53.6 1.5
July 9.6	31.15 .19	69.7 2.9	33.90 .26	29.4 3.4	11.86 .20	30.7 2.5	50.99 .22	52.1 1.4
19.6	31.32 .15	72.6 2.8	34.11 .17	32.9 3.5	12.04 .16	33.2 2.5	51.19 .18	50.8 1.2
29.5	31.45 .10	75.4 2.8	34.24 .09	36.5 3.6	12.17 .12	35.6 2.4	51.35 .14	49.7 1.0
Aug. 8.5	31.52 +05	78.2 2.7	34.29 +01	40.1 3.6	12.27 .07	37.9 2.2	51.47 .10	48.7 0.8
18.5	31.55 .00	80.7 2.5	34.26 -07	43.6 3.5	12.32 +03	40.0 2.0	51.54 .05	48.0 0.6
28.5	31.53 -04	83.1 2.2	34.16 .14	47.0 3.3	12.39 -02	41.9 1.8	51.57 +01	47.5 0.4
Sept. 7.4	31.47 .06	85.2 2.0	33.98 .21	50.2 3.0	12.28 .06	43.6 1.5	51.56 -03	47.1 0.2
17.4	31.37 .12	87.0 1.6	33.73 .28	53.1 2.7	12.20 .09	45.0 1.3	51.51 .07	47.0 -0.1
27.4	31.24 .15	88.5 1.3	33.42 .33	55.7 2.3	12.09 .12	46.1 1.0	51.42 .10	47.0 +0.1
Oct. 7.3	31.07 .17	89.6 0.9	33.07 .37	57.8 1.9	11.96 .14	46.9 0.7	51.31 .12	47.2 0.2
17.3	30.90 .18	90.4 0.6	32.68 .41	59.5 1.4	11.81 .15	47.4 +0.3	51.18 .13	47.5 0.4
27.3	30.71 .19	90.8 +0.2	32.26 .42	60.7 0.9	11.65 .16	47.6 0.0	51.05 .14	47.9 0.4
Nov. 6.3	30.52 .18	90.7 -0.2	31.83 .43	61.4 +0.4	11.49 .16	47.5 -0.3	50.91 .13	48.4 0.5
16.2	30.34 .17	90.3 0.6	31.40 .42	61.5 -0.2	11.34 .15	47.0 0.6	50.78 .12	48.9 0.6
26.2	30.17 .16	89.5 1.0	30.98 .40	61.0 0.8	11.20 .13	46.3 0.9	50.66 .11	49.6 0.6
Dec. 6.2	30.03 .13	88.2 1.4	30.59 .37	60.1 1.3	11.08 .11	45.2 1.2	50.56 .09	50.2 0.6
16.2	29.91 .10	86.6 1.7	30.24 .33	58.4 1.8	10.98 .08	43.9 1.4	50.48 .08	50.9 0.7
26.1	29.82 .07	84.8 2.0	29.93 .28	56.3 2.3	10.91 .06	42.3 1.6	50.43 .04	51.5 0.6
36.1	29.76 -04	82.7 -2.2	29.68 -21	53.8 -2.7	10.87 -03	40.6 -1.8	50.41 -01	52.1 +0.6

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	*β Cephei.		ξ Aquarii.		ε Pegasi.		*11 Cephei.	
	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension	Declination North.	Right Ascension.	Declination North.
	<sup>h</sup> 21 <sup>m</sup> 26	<sup>°</sup> 69 <sup>'</sup> 59	<sup>h</sup> 21 <sup>m</sup> 30	<sup>°</sup> 8 <sup>'</sup> 25	<sup>h</sup> 21 <sup>m</sup> 37	<sup>°</sup> 9 <sup>'</sup> 17	<sup>h</sup> 21 <sup>m</sup> 39	<sup>°</sup> 70 <sup>'</sup> 42
Jan. 2.1	56.54 -40	61.7 -2.4	54.12 -0.03	45.7 +0.5	52.02 -0.05	16.8 -1.3	58.96 -44	86.5 -2.3
12.1	56.18 .31	59.0 2.8	54.11 .00	46.2 0.5	51.99 -0.02	15.4 1.3	58.55 .35	84.0 2.7
22.1	55.92 .21	56.1 3.1	54.13 +0.03	46.6 0.4	51.99 +0.01	14.1 1.3	58.25 .25	81.1 3.0
Feb. 1.0	55.77 -10	52.9 3.3	54.17 .06	47.0 0.2	52.02 .04	12.8 1.3	58.05 .14	77.9 3.2
11.0	55.73 +0.2	49.5 3.3	54.25 .09	47.1 +0.1	52.08 .08	11.6 1.1	57.97 -0.2	74.7 3.3
21.0	55.80 .13	46.2 3.2	54.36 .12	47.2 -0.1	52.17 .11	10.5 1.0	58.00 +10	71.4 3.2
Mar. 1.9	55.99 .25	43.1 3.0	54.50 .15	47.0 0.3	52.29 .14	9.6 0.7	58.16 .22	68.2 3.0
11.9	56.29 .35	40.2 2.7	54.67 .18	46.6 0.5	52.45 .17	9.0 0.4	58.44 .33	65.3 2.7
21.9	56.70 .45	37.8 2.2	54.87 .21	46.0 0.7	52.63 .20	8.8 -0.1	58.83 .43	62.7 2.3
31.9	57.19 .53	35.8 1.7	55.10 .24	45.1 0.9	52.85 .23	8.8 +0.2	59.31 .52	60.6 1.8
Apr. 10.8	57.76 .59	34.3 1.1	55.35 .28	44.1 1.2	53.10 .26	9.2 0.6	59.87 .60	59.0 1.3
20.8	58.38 .64	33.5 -0.5	55.63 .29	42.8 1.3	53.37 .28	10.0 0.9	60.50 .65	58.0 0.7
30.8	59.04 .67	33.3 +0.1	55.92 .30	41.4 1.5	53.65 .30	11.1 1.2	61.18 .68	57.6 -0.1
May 10.8	59.71 .67	33.7 0.7	56.23 .31	39.8 1.6	53.96 .31	12.5 1.5	61.87 .69	57.9 +0.6
20.7	60.38 .65	34.7 1.3	56.55 .32	38.2 1.7	54.27 .31	14.1 1.8	62.57 .68	58.8 1.1
30.7	61.02 .62	30.3 1.8	56.86 .31	36.5 1.7	54.58 .31	16.0 2.0	63.24 .65	60.2 1.7
June 9.7	61.62 .57	38.4 2.3	57.17 .30	34.8 1.7	54.88 .30	18.1 2.1	63.87 .60	62.1 2.2
19.6	62.15 .50	41.0 2.7	57.47 .28	33.1 1.6	55.17 .28	20.2 2.1	64.45 .54	64.6 2.6
29.6	62.61 .42	43.9 3.1	57.74 .26	31.6 1.5	55.44 .25	22.4 2.2	64.95 .46	67.4 3.0
July 9.6	62.99 .32	47.2 3.4	57.99 .23	30.2 1.3	55.68 .22	24.5 2.1	65.36 .37	70.6 3.3
19.6	63.26 .22	50.7 3.5	58.20 .19	29.0 1.1	55.88 .18	26.6 2.0	65.68 .27	74.0 3.5
29.5	63.43 .12	54.3 3.6	58.37 .15	27.9 0.9	56.04 .14	28.6 1.9	65.89 .16	77.6 3.6
Aug. 8.5	63.50 +0.01	57.9 3.7	58.49 .10	27.1 0.7	56.17 .10	30.5 1.7	66.00 +0.05	81.3 3.7
18.5	63.46 -0.09	61.6 3.6	58.57 .06	26.5 0.5	56.24 .05	32.1 1.5	65.99 -0.06	85.0 3.7
28.5	63.31 .19	65.1 3.5	58.61 +0.01	26.1 0.3	56.27 +0.01	33.6 1.3	65.88 .16	88.6 3.5
Sept. 7.4	63.07 .29	68.5 3.3	58.60 -0.03	25.9 -0.1	56.27 -0.03	34.8 1.1	65.67 .26	92.1 3.4
17.4	62.73 .38	71.7 3.0	58.56 .06	25.9 +0.1	56.22 .06	35.7 0.8	65.35 .36	95.3 3.1
27.4	62.31 .45	74.5 2.6	58.48 .09	26.0 0.2	56.14 .09	36.4 0.6	64.95 .44	98.3 2.8
Oct. 7.3	61.82 .52	76.9 2.2	58.37 .11	26.3 0.3	56.03 .11	36.9 0.4	64.48 .51	100.9 2.4
17.3	61.28 .57	79.0 1.8	58.25 .13	26.7 0.4	55.91 .13	37.2 +0.1	63.94 .56	103.1 2.0
27.3	60.69 .60	80.5 1.3	58.11 .14	27.1 0.5	55.77 .14	37.2 -0.1	63.35 .60	104.8 1.5
Nov. 6.3	60.08 .62	81.5 0.7	57.97 .13	27.6 0.5	55.63 .14	37.0 0.3	62.73 .63	106.0 0.9
16.2	59.46 .62	81.9 +0.1	57.84 .13	28.2 0.6	55.49 .13	36.5 0.5	62.09 .64	106.7 +0.3
26.2	58.84 .60	81.7 -0.5	57.72 .11	28.8 0.6	55.36 .12	35.9 0.7	61.46 .63	106.7 -0.3
Dec. 6.2	58.25 .57	80.9 1.1	57.62 .09	29.4 0.6	55.25 .10	35.0 0.9	60.84 .60	106.2 0.6
16.2	57.71 .51	79.6 1.6	57.54 .07	30.0 0.6	55.16 .08	34.0 1.1	60.26 .55	105.0 1.4
26.1	57.22 .45	77.7 2.1	57.49 .04	30.6 0.5	55.09 .06	32.9 1.2	59.74 .49	103.3 2.0
36.1	56.81 -0.37	75.3 -2.6	57.46 -0.01	31.1 +0.5	55.05 -0.03	31.6 -1.3	59.28 -0.41	101.1 -2.5

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\mu$ Capricorni.		*79 Draconis.		$\alpha$ Aquarii.		$\alpha$ Gruis.	
	Right Ascension	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination South.
	<sup>h</sup> 21 46	<sup>m</sup> 14 8	<sup>h</sup> 21 51	<sup>m</sup> 73 5	<sup>h</sup> 21 59	<sup>m</sup> 0 56	<sup>h</sup> 22 0	<sup>m</sup> 47 34
Jan. 2.1	16.92 -.04	80.6 +0.2	12.81 -.55	56.1 -2.1	10.64 -.05	34.0 +0.8	6.90 -.09	64.2 -1.3
12.1	16.90 -.01	80.8 +0.1	12.32 .45	53.7 2.6	10.61 -.02	34.8 0.8	6.83 .05	62.8 1.6
22.1	16.91 +.02	80.9 0.0	11.92 .33	50.9 2.9	10.59 .00	35.6 0.7	6.80 -.01	61.0 1.9
Feb. 1.0	16.94 .05	80.8 -0.1	11.65 .31	47.8 3.2	10.61 +.03	36.3 0.6	6.82 +.04	59.0 2.1
11.0	17.01 .08	80.6 0.3	11.51 -.07	44.6 3.3	10.66 .06	36.9 0.5	6.88 .08	56.8 2.3
21.0	17.11 .11	80.2 0.5	11.50 +.06	41.3 3.2	10.73 .09	37.3 0.3	6.98 .13	54.5 2.4
Mar. 2.0	17.24 .14	79.7 0.7	11.64 .30	38.1 3.1	10.84 .12	37.5 +0.1	7.14 .18	52.0 2.5
11.9	17.39 .18	78.9 0.8	11.91 .33	35.1 2.8	10.98 .15	37.5 -0.1	7.34 .22	49.5 2.5
21.9	17.59 .21	78.0 1.0	12.30 .46	32.4 2.5	11.15 .19	37.2 0.4	7.58 .26	46.9 2.5
31.9	17.81 .23	76.8 1.2	12.82 .56	30.2 2.0	11.35 .21	36.7 0.7	7.86 .30	44.4 2.5
Apr. 10.9	18.05 .26	75.5 1.4	13.43 .65	28.4 1.5	11.58 .24	35.8 1.0	8.19 .34	42.0 2.4
20.8	18.33 .29	74.0 1.5	14.11 .71	27.3 0.9	11.83 .27	34.7 1.2	8.55 .37	39.7 2.2
30.8	18.62 .30	72.4 1.6	14.66 .76	26.7 -0.3	12.11 .29	33.4 1.4	8.94 .40	37.5 2.0
May 10.8	18.94 .32	70.8 1.7	15.63 .77	26.8 +0.4	12.41 .30	31.9 1.6	9.35 .42	35.7 1.7
20.7	19.26 .32	69.1 1.7	16.41 .77	27.4 1.0	12.72 .31	30.2 1.8	9.78 .43	34.1 1.5
30.7	19.58 .32	67.4 1.7	17.17 .74	28.7 1.5	13.04 .31	28.3 1.9	10.22 .44	32.8 1.1
June 9.7	19.91 .31	65.8 1.6	17.89 .69	30.5 2.0	13.35 .31	26.4 1.9	10.65 .43	31.8 0.8
19.7	20.21 .30	64.2 1.5	18.55 .62	32.8 2.5	13.65 .29	24.5 1.8	11.07 .41	31.2 -0.4
29.6	20.50 .27	62.8 1.3	19.13 .53	35.5 2.9	13.93 .27	22.6 1.7	11.47 .38	31.1 0.0
July 9.6	20.76 .24	61.6 1.1	19.61 .43	38.6 3.2	14.19 .24	20.8 1.6	11.84 .34	31.3 +0.4
19.6	20.99 .21	60.6 0.9	19.99 .32	41.9 3.5	14.41 .21	19.1 1.4	12.16 .30	31.9 0.8
29.6	21.18 .17	59.8 0.7	20.26 .20	45.5 3.6	14.60 .17	17.6 1.2	12.43 .24	32.8 1.1
Aug. 8.5	21.33 .12	59.3 0.4	20.40 +.08	49.2 3.7	14.75 .12	16.3 1.0	12.64 .18	34.1 1.4
18.5	21.42 .08	59.0 -0.2	20.42 -.04	52.9 3.7	14.85 .08	15.3 0.8	12.79 .12	35.6 1.6
28.5	21.48 +.03	58.9 0.0	20.32 .16	56.6 3.6	14.91 +.04	14.3 0.6	12.88 +.05	37.4 1.8
Sept. 7.4	21.49 -.01	59.0 +0.2	20.11 .27	60.1 3.5	14.93 .00	13.6 0.4	12.90 -.01	39.3 1.9
17.4	21.46 .05	59.3 0.3	19.78 .38	63.5 3.2	14.90 -.04	13.1 -0.2	12.86 .07	41.2 1.9
27.4	21.39 .08	59.7 0.5	19.35 .47	66.6 2.9	14.85 .07	12.9 0.0	12.77 .12	43.1 1.9
Oct. 7.4	21.30 .11	60.2 0.6	18.83 .56	69.4 2.6	14.76 .10	12.8 +0.2	12.63 .16	44.9 1.7
17.3	21.18 .12	60.8 0.6	18.24 .62	71.8 2.1	14.66 .11	12.9 0.3	12.45 .19	46.6 1.5
27.3	21.05 .13	61.5 0.6	17.58 .68	73.7 1.7	14.53 .12	13.2 0.5	12.25 .21	47.9 1.2
Nov. 6.3	20.91 .13	62.1 0.6	16.88 .71	75.1 1.1	14.41 .13	13.6 0.6	12.03 .22	49.0 0.9
16.3	20.78 .13	62.7 0.6	16.16 .73	75.9 +0.6	14.28 .12	14.1 0.7	11.81 .21	49.7 0.5
26.2	20.66 .12	63.3 0.5	15.43 .73	76.2 0.0	14.16 .11	14.7 0.7	11.60 .20	50.0 +0.1
Dec. 6.2	20.55 .10	63.8 0.5	14.71 .70	75.8 -0.6	14.05 .10	15.4 0.7	11.41 .18	49.9 -0.3
16.2	20.46 .08	64.2 0.4	14.02 .66	74.9 1.2	13.96 .08	16.2 0.8	11.24 .15	49.4 0.7
26.1	20.40 .05	64.6 0.3	13.40 .59	73.4 1.8	13.88 .05	16.9 0.8	11.11 .11	48.5 1.1
36.1	20.36 -.02	64.8 +0.2	12.85 -.51	71.3 -2.3	13.84 -.03	17.7 +0.8	11.02 -.07	47.3 -1.4



## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\theta$ Aquarii.		$\pi$ Aquarii.		$\eta$ Aquarii.		*226 Cephei (B.)	
	Right Ascension.	Declination South.	Right Ascension	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination North.
	<sup>h</sup> 22 <sup>m</sup> 10	<sup>°</sup> 6 <sup>'</sup> 24	<sup>h</sup> 22 <sup>m</sup> 18	<sup>°</sup> 6 <sup>'</sup> 43	<sup>h</sup> 22 <sup>m</sup> 28	<sup>°</sup> 6 <sup>'</sup> 46	<sup>h</sup> 22 <sup>m</sup> 29	<sup>°</sup> 75 <sup>'</sup> 33
Jan. 2.3	2.62 - .00	60.7 +0.4	42.58 - .00	35.9 -0.6	44.94 - .07	43.1 +0.8	57.48 - .73	70.0 -1.6
13.1	2.77 - .03	61.1 0.4	42.53 .04	35.1 0.3	44.88 .05	43.8 0.7	56.80 .63	68.2 2.1
23.1	2.76 .00	61.4 0.3	42.50 - .02	34.3 0.8	44.85 - .02	44.6 0.7	56.22 .32	65.8 2.6
Feb. 1.1	2.77 + .02	61.7 +0.2	42.50 + .01	33.6 0.7	44.84 .00	45.2 0.6	55.76 .30	63.0 2.9
11.0	2.81 .02	61.8 0.0	42.52 .04	32.9 0.5	44.86 + .02	45.7 0.4	55.44 .34	60.0 3.1
21.0	2.87 .00	61.7 -0.2	42.58 .07	32.5 0.4	44.90 .02	46.1 0.3	55.27 - .08	56.8 3.2
Mar. 2.0	2.97 .12	61.5 0.4	42.66 .10	32.2 -0.2	44.98 .09	46.3 +0.1	55.27 + .08	53.6 3.2
12.0	3.11 .15	61.0 0.6	42.78 .14	32.1 +0.1	45.09 .13	46.2 -0.2	55.44 .34	50.5 3.0
21.9	3.27 .18	60.3 0.8	42.93 .17	32.3 0.2	45.23 .16	45.9 0.4	55.76 .40	47.6 2.7
31.9	3.47 .21	79.4 1.0	43.12 .20	32.8 0.6	45.41 .19	45.4 0.7	56.23 .54	45.0 2.3
Apr. 10.9	3.69 .24	78.2 1.2	43.24 .22	33.6 0.9	45.61 .22	44.5 1.0	56.83 .08	42.9 1.9
20.9	3.85 .27	76.8 1.5	43.58 .26	34.6 1.2	45.85 .25	43.4 1.2	57.55 .76	41.2 1.4
30.8	4.03 .29	75.3 1.6	43.85 .28	35.9 1.4	46.12 .28	42.0 1.5	58.34 .83	40.2 0.8
May 10.8	4.53 .31	73.6 1.7	44.14 .30	37.4 1.6	46.41 .30	40.5 1.6	59.21 .88	39.7 -0.2
20.8	4.84 .32	71.8 1.8	44.45 .31	39.2 1.8	46.71 .31	38.7 1.8	60.10 .90	39.8 +0.4
30.7	5.46 .32	70.9 1.8	44.76 .31	41.0 1.9	47.02 .31	36.9 1.9	61.00 .89	40.6 1.0
June 9.7	5.66 .31	68.1 1.8	45.06 .31	43.0 2.0	47.24 .31	34.9 2.0	61.87 .85	41.9 1.6
19.7	5.79 .30	66.4 1.7	45.30 .29	45.0 2.0	47.65 .30	32.9 2.0	62.70 .79	43.7 2.1
29.7	6.06 .29	64.7 1.6	45.68 .28	47.0 1.9	47.95 .29	31.9 1.9	63.46 .71	46.0 2.5
July 9.6	6.25 .25	63.1 1.4	45.95 .25	48.8 1.8	48.22 .26	29.1 1.8	64.12 .61	48.8 2.9
19.6	6.50 .22	61.8 1.3	46.18 .22	50.7 1.7	48.47 .23	27.8 1.7	64.68 .50	51.9 3.2
29.6	6.70 .18	60.6 1.0	46.20 .18	52.3 1.5	48.68 .19	25.8 1.5	65.12 .37	55.3 3.5
Aug. 8.6	6.85 .14	59.7 0.8	46.55 .14	53.8 1.4	48.85 .15	24.4 1.3	65.43 .24	58.9 3.7
18.5	7.07 .10	59.0 0.6	46.67 .10	55.0 1.1	48.98 .11	23.2 1.1	65.60 + .10	62.6 3.7
28.5	7.44 .03	58.5 0.4	46.75 .08	56.0 0.9	49.07 .07	22.2 0.8	65.63 - .03	66.4 3.7
Sept. 7.5	7.17 + .01	58.3 -0.1	46.78 + .02	56.8 0.7	49.12 + .02	21.5 0.6	65.53 .16	70.1 3.7
17.4	7.46 - .02	58.9 0.0	46.78 - .02	57.4 0.5	49.12 - .01	21.0 0.4	65.31 .20	73.7 3.5
27.4	7.12 .02	58.2 +0.2	46.74 .02	57.8 0.3	49.10 .04	20.7 -0.2	64.94 .42	77.2 3.3
Oct. 7.4	7.04 .02	58.6 0.4	46.67 .02	57.9 +0.1	49.03 .07	20.6 0.0	64.47 .58	80.4 2.0
17.4	6.94 .11	59.1 0.5	46.58 .10	57.9 -0.1	48.95 .08	20.7 +0.2	63.89 .02	83.2 2.7
27.3	6.83 .12	59.6 0.5	46.47 .12	57.7 0.2	48.85 .11	20.9 0.2	63.22 .70	86.7 2.2
Nov. 6.3	6.70 .12	60.2 0.6	46.35 .12	57.4 0.4	48.73 .12	21.3 0.4	62.48 .77	87.7 1.7
16.3	6.58 .12	60.7 0.6	46.22 .12	56.9 0.5	48.61 .12	21.8 0.5	61.69 .81	89.1 1.2
26.3	6.46 .11	61.4 0.6	46.11 .12	56.3 0.6	48.49 .11	22.4 0.6	60.86 .84	90.0 +0.6
Dec. 6.2	6.35 .16	62.0 0.6	45.99 .11	55.6 0.7	48.38 .11	23.1 0.7	60.01 .84	90.3 0.0
16.2	6.25 .09	62.6 0.6	45.89 .09	54.9 0.8	48.26 .09	23.8 0.7	59.18 .81	90.0 -0.6
26.2	6.18 .07	63.2 0.5	45.81 .07	54.1 0.8	48.20 .08	24.5 0.8	58.38 .76	89.1 1.2
36.1	6.12 - .04	63.6 +0.4	45.75 - .05	53.3 -0.8	48.13 - .06	25.3 +0.8	57.65 - .60	87.6 -1.7

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ζ Pegasi.		* Cephei.		λ Aquarii.		α Piscis Australis. (Fomalhaut.)	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination South.
	<sup>h</sup> <sup>m</sup> 22 35	<sup>°</sup> <sup>'</sup> 10 9	<sup>h</sup> <sup>m</sup> 22 45	<sup>°</sup> <sup>'</sup> 66 31	<sup>h</sup> <sup>m</sup> 22 45	<sup>°</sup> <sup>'</sup> 8 15	<sup>h</sup> <sup>m</sup> 22 50	<sup>°</sup> <sup>'</sup> 30 17
Jan. 2.2	2.94 - .06	45.9 - 1.1	5.18 - .40	47.7 - 1.5	54.41 - .07	46.0 + 0.5	32.03 - .09	76.2 - 0.3
12.1	2.87 .06	44.7 1.2	4.80 .35	46.0 2.0	54.34 .06	46.4 0.4	32.54 .07	75.7 0.6
22.1	2.82 .03	43.5 1.2	4.48 .29	43.7 2.4	54.29 .03	46.8 0.3	32.48 .04	75.0 0.8
Feb. 1.1	2.80 - .01	42.4 1.1	4.22 .22	41.1 2.8	54.27 - .01	47.0 + 0.1	32.45 - .02	74.1 1.1
11.1	2.80 + .02	41.3 1.1	4.03 .14	38.1 3.0	54.28 + .02	47.1 0.0	32.44 + .01	72.8 1.3
21.0	2.83 .05	40.3 0.9	3.93 - .05	35.1 3.1	54.31 .05	46.9 - 0.2	32.47 .05	71.4 1.6
Mar. 2.0	2.90 .06	39.4 0.7	3.93 + .04	32.0 3.0	54.37 .06	46.6 0.4	32.54 .06	69.7 1.8
12.0	3.00 .12	38.8 0.5	4.03 .14	29.0 2.9	54.46 .11	46.1 0.6	32.64 .12	67.9 1.9
22.0	3.13 .15	38.5 - 0.2	4.21 .23	26.2 2.6	54.59 .15	45.3 0.9	32.78 .16	65.9 2.1
31.9	3.30 .19	38.5 + 0.1	4.40 .32	23.8 2.2	54.75 .18	44.3 1.1	32.96 .20	63.8 2.2
Apr. 10.9	3.51 .22	38.8 0.5	4.85 .40	21.7 1.8	54.96 .21	43.1 1.3	33.17 .23	61.5 2.2
20.9	3.74 .25	39.5 0.8	5.29 .47	20.2 1.3	55.18 .24	41.7 1.5	33.42 .27	59.3 2.3
30.8	4.01 .28	40.4 1.1	5.79 .52	19.2 0.7	55.44 .27	40.0 1.7	33.71 .30	57.0 2.2
May 10.8	4.30 .30	41.7 1.4	6.33 .56	18.8 - 0.1	55.72 .29	38.3 1.8	34.02 .32	54.8 2.2
20.8	4.60 .31	43.3 1.7	6.90 .58	19.0 + 0.5	56.03 .31	36.4 1.9	34.36 .34	52.6 2.0
30.8	4.92 .32	45.1 1.9	7.49 .58	19.8 1.0	56.34 .32	34.4 1.9	34.71 .35	50.7 1.9
June 9.7	5.23 .31	47.1 2.1	8.07 .57	21.1 1.6	56.66 .32	32.5 1.9	35.07 .36	48.9 1.8
19.7	5.54 .30	49.2 2.2	8.63 .54	23.0 2.1	56.98 .31	30.6 1.9	35.43 .35	47.4 1.4
29.7	5.84 .29	51.4 2.2	9.15 .50	25.3 2.5	57.29 .30	28.8 1.8	35.77 .34	46.1 1.1
July 9.7	6.12 .26	53.7 2.2	9.62 .44	28.0 2.9	57.58 .27	27.1 1.6	36.10 .31	45.2 0.7
19.6	6.36 .23	55.8 2.1	10.03 .37	31.1 3.2	57.84 .25	25.6 1.4	36.40 .28	44.6 0.4
29.6	6.58 .19	57.9 2.0	10.37 .30	34.4 3.4	58.07 .21	24.3 1.3	36.67 .24	44.4 - 0.1
Aug. 8.6	6.75 .15	59.9 1.9	10.63 .22	37.9 3.6	58.26 .17	23.3 0.9	36.89 .20	44.5 + 0.2
18.5	6.88 .11	61.7 1.7	10.81 .13	41.6 3.7	58.41 .13	22.5 0.7	37.07 .15	45.0 0.6
28.5	6.97 .07	63.3 1.5	10.90 + .05	45.2 3.7	58.52 .09	21.9 0.4	37.20 .10	45.7 0.9
Sept. 7.5	7.02 + .03	64.7 1.3	10.91 - .03	48.9 3.6	58.59 .05	21.6 - 0.3	37.28 .06	46.7 1.1
17.5	7.03 - .01	65.8 1.0	10.84 .11	52.4 3.4	58.61 + .01	21.5 0.0	37.31 + .01	47.9 1.2
27.4	7.00 .04	66.7 0.8	10.69 .19	55.8 3.2	58.60 - .03	21.7 + 0.2	37.30 - .03	49.2 1.4
Oct. 7.4	6.94 .07	67.4 0.5	10.47 .25	58.9 2.9	58.56 .06	22.0 0.4	37.25 .07	50.6 1.4
17.4	6.85 .09	67.8 0.3	10.18 .31	61.6 2.6	58.48 .08	22.4 0.5	37.16 .10	52.0 1.4
27.4	6.75 .11	68.0 + 0.1	9.84 .36	64.0 2.1	58.39 .10	23.0 0.6	37.08 .12	53.3 1.3
Nov. 6.3	6.64 .12	68.0 - 0.1	9.45 .40	65.9 1.7	58.28 .11	23.6 0.6	36.99 .14	54.6 1.1
16.3	6.51 .19	67.7 0.3	9.03 .42	67.3 1.1	58.16 .12	24.2 0.7	36.78 .16	56.6 0.9
26.3	6.39 .12	67.3 0.5	8.58 .45	68.2 + 0.6	58.05 .11	24.9 0.7	36.63 .14	58.5 0.7
Dec. 6.2	6.27 .11	66.7 0.7	8.13 .45	68.5 0.0	57.94 .11	25.6 0.6	36.49 .12	57.0 0.4
16.2	6.16 .10	65.9 0.9	7.68 .44	68.2 - 0.6	57.83 .10	26.2 0.6	36.36 .10	57.4 + 0.2
26.2	6.07 .09	64.9 1.0	7.24 .46	67.3 1.2	57.74 .08	26.7 0.5	36.26 .10	57.4 - 0.1
36.2	5.99 - .07	63.9 - 1.1	6.84 - .38	65.8 - 1.7	57.67 - .06	27.2 + 0.5	36.15 - .08	57.1 - 0.4

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Pegasi.		$\gamma$ Cephei.		$\theta$ Piscium.		$\iota$ Piscium.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	<sup>h</sup> 22 58	<sup>m</sup> 14 30'	<sup>h</sup> 23 13	<sup>m</sup> 67 24'	<sup>h</sup> 23 21	<sup>m</sup> 5 40'	<sup>h</sup> 23 33	<sup>m</sup> 4 55'
Jan. 2.2	21.55 -0.09	58.8 -1.1	20.43 -0.46	50.0 -1.1	27.03 -0.10	29.1 -0.8	20.67 -0.10	51.9 -0.8
12.2	21.46 .08	57.6 1.2	19.98 .42	48.6 1.7	26.94 .08	28.3 0.8	20.58 .09	51.1 0.8
22.1	21.39 .06	56.4 1.3	19.58 .37	46.7 2.1	26.86 .07	27.4 0.9	20.49 .07	50.3 0.8
Feb. 1.1	21.34 .03	55.1 1.3	19.24 .30	44.3 2.5	26.81 .05	26.6 0.8	20.43 .05	49.5 0.7
11.1	21.32 -0.01	53.8 1.2	18.98 .22	41.6 2.8	26.77 -0.02	25.8 0.7	20.39 -0.03	48.8 0.6
21.1	21.33 +0.02	52.6 1.1	18.80 .13	38.7 3.0	26.76 +0.01	25.2 0.6	20.37 .00	48.2 0.5
Mar. 2.0	21.37 .06	51.6 0.9	18.73 -0.03	35.6 * 3.0	26.78 .04	24.7 0.4	20.37 +0.03	47.7 0.3
12.0	21.44 .09	50.8 0.7	18.75 +0.08	32.6 3.0	26.83 .07	24.4 -0.2	20.42 .06	47.5 -0.1
22.0	21.55 .13	50.2 0.4	18.88 .18	29.7 2.8	26.92 .11	24.4 +0.1	20.50 .10	47.5 +0.1
Apr. 1.0	21.70 .17	49.9 -0.1	19.12 .28	27.1 2.4	27.05 .14	24.6 0.4	20.61 .13	47.8 0.4
10.9	21.89 .20	50.0 +0.2	19.45 .28	24.8 2.0	27.21 .18	25.1 0.7	20.76 .17	48.3 0.7
20.9	22.11 .24	50.4 0.6	19.87 .46	23.0 1.6	27.41 .22	25.9 1.0	20.95 .21	49.1 1.0
30.9	22.37 .27	51.2 0.9	20.37 .53	21.7 1.0	27.65 .25	27.0 1.2	21.18 .24	50.2 1.2
May 10.8	22.64 .29	52.2 1.3	20.92 .58	20.9 -0.5	27.91 .28	28.4 1.5	21.44 .27	51.6 1.5
20.8	22.95 .31	53.7 1.5	21.52 .61	20.7 +0.1	28.20 .30	30.0 1.7	21.72 .30	53.2 1.8
30.8	23.26 .32	55.4 1.8	22.14 .63	21.1 0.7	28.50 .31	31.8 1.9	22.03 .31	55.0 1.9
June 9.8	23.58 .32	57.4 2.0	22.77 .69	22.1 1.2	28.82 .32	33.7 2.0	22.34 .32	57.0 2.0
19.7	23.90 .31	59.5 2.2	23.39 .60	23.6 1.8	29.14 .31	35.8 2.1	22.66 .32	59.0 2.1
29.7	24.21 .30	61.7 2.3	23.98 .57	25.6 2.2	29.45 .30	37.9 2.1	22.98 .31	61.1 2.1
July 9.7	24.50 .28	64.0 2.3	24.53 .52	28.0 2.6	29.75 .29	40.0 2.1	23.28 .29	63.2 2.0
19.7	24.76 .25	66.3 2.3	25.02 .45	30.9 3.0	30.02 .26	42.1 2.0	23.56 .27	65.2 2.0
29.6	24.99 .21	68.6 2.2	25.44 .28	34.0 3.3	30.27 .23	44.0 1.8	23.82 .24	67.1 1.8
Aug. 8.6	25.19 .17	70.8 2.1	25.78 .20	37.4 3.5	30.48 .19	45.8 1.7	24.04 .21	68.8 1.7
18.6	25.34 .13	72.8 1.9	26.04 .22	41.0 3.6	30.66 .16	47.4 1.5	24.23 .17	70.4 1.5
28.5	25.45 .09	74.7 1.7	26.21 .13	44.7 3.7	30.79 .12	48.8 1.3	24.38 .13	71.8 1.3
Sept. 7.5	25.52 .05	76.3 1.5	26.30 +0.04	48.4 3.7	30.89 .08	50.0 1.1	24.49 .09	72.9 1.0
17.5	25.55 +0.01	77.7 1.3	26.29 -0.05	52.0 3.6	30.95 +0.04	50.9 0.9	24.56 .05	73.8 0.8
27.5	25.55 -0.02	78.9 1.1	26.20 .13	55.5 3.4	30.97 .00	51.6 0.6	24.59 +0.01	74.5 0.5
Oct. 7.4	25.51 .05	79.9 0.8	26.04 .21	58.8 3.2	30.95 -0.03	52.1 0.4	24.50 -0.02	74.9 0.3
17.4	25.44 .08	80.6 0.6	25.79 .28	61.9 2.9	30.91 .05	52.4 +0.2	24.56 .04	75.1 +0.1
27.4	25.35 .10	81.0 0.3	25.48 .34	64.6 2.5	30.84 .07	52.5 0.0	24.50 .06	75.1 -0.1
Nov. 6.4	25.25 .11	81.2 +0.1	25.12 .29	66.9 2.1	30.76 .09	52.3 -0.2	24.43 .08	75.0 0.2
16.3	25.13 .12	81.2 -0.2	24.70 .43	68.7 1.6	30.66 .10	52.1 0.4	24.34 .09	74.7 0.4
26.3	25.01 .12	80.9 0.4	24.25 .46	70.0 1.0	30.55 .11	51.6 0.5	24.24 .10	74.3 0.5
Dec. 6.3	24.89 .12	80.4 0.6	23.77 .48	70.7 +0.4	30.45 .11	51.1 0.6	24.13 .10	73.7 0.6
16.2	24.77 .11	79.7 0.8	23.28 .48	70.8 -0.2	30.34 .11	50.4 0.7	24.03 .11	73.0 0.7
26.2	24.66 .10	78.8 1.0	22.80 .47	70.4 0.7	30.23 .10	49.7 0.8	23.92 .10	72.3 0.7
36.2	24.57 -0.08	77.7 -1.1	22.34 -0.45	69.4 -1.2	30.14 -0.09	48.9 -0.8	23.83 -0.09	71.5 -0.8

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	* $\gamma$ Cephei.		*Groombridge 4163.		$\omega$ Piscium.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	<sup>h</sup> 23 <sup>m</sup> 33	<sup>°</sup> 76 <sup>'</sup> 54	<sup>h</sup> 23 <sup>m</sup> 48	<sup>°</sup> 73 <sup>'</sup> 41	<sup>h</sup> 23 <sup>m</sup> 52	<sup>°</sup> 6 <sup>'</sup> 9
Jan. 2.2	<sup>s</sup> 63.72 -.89	77.0 -0.7	<sup>s</sup> 35.46 -.89	64.3 -0.5	<sup>s</sup> 43.07 -.11	11.5 -0.8
12.2	62.85 .83	76.0 1.3	34.78 .66	63.5 1.1	42.96 .10	10.7 0.8
22.1	62.05 .75	74.4 1.8	34.14 .61	62.1 1.7	42.87 .09	9.9 0.8
Feb. 1.1	61.35 .64	72.3 2.3	33.56 .53	60.1 2.2	42.79 .07	9.1 0.7
11.1	60.77 .50	69.8 2.7	33.08 .43	57.7 2.5	42.73 .05	8.4 0.7
21.1	60.34 .35	67.0 2.9	32.70 .31	55.0 2.8	42.69 -.00	7.8 0.5
Mar. 2.0	60.08 -.18	64.0 3.1	32.46 .17	52.1 3.0	42.68 +.01	7.3 0.4
12.0	59.99 .00	60.9 3.1	32.36 -.03	49.0 3.0	42.70 .04	7.1 -0.2
22.0	60.08 +.19	57.8 3.0	32.39 +.12	46.0 2.9	42.76 .08	7.0 +0.1
Apr. 1.0	60.35 .36	54.9 2.7	32.53 .96	43.1 2.7	42.85 .12	7.2 0.3
10.9	60.79 .52	52.3 2.4	32.91 .39	40.5 2.4	42.99 .15	7.7 0.6
20.9	61.39 .67	50.1 2.0	33.37 .52	38.2 2.0	43.16 .19	8.4 0.9
30.9	62.13 .79	48.3 1.5	33.94 .69	36.4 1.6	43.38 .23	9.5 1.2
May 10.8	62.97 .88	47.0 1.0	34.62 .71	35.1 1.0	43.62 .26	10.8 1.4
20.8	63.90 .85	46.4 -0.4	35.37 .77	34.3 -0.5	43.90 .28	12.3 1.6
30.8	64.87 .99	46.3 +0.2	36.17 .81	34.1 +0.1	44.19 .30	14.1 1.8
June 9.8	65.87 1.00	46.7 0.8	36.99 .83	34.5 0.7	44.50 .32	16.0 2.0
19.7	66.87 .97	47.8 1.3	37.83 .82	35.4 1.2	44.82 .32	18.0 2.1
29.7	67.82 .93	49.4 1.8	38.64 .79	36.9 1.7	45.14 .31	20.1 2.1
July 9.7	68.72 .86	51.5 2.3	39.41 .74	38.9 2.2	45.45 .30	22.2 2.1
19.7	69.53 .77	54.0 2.7	40.12 .67	41.3 2.6	45.74 .28	24.3 2.0
29.6	70.25 .65	56.9 3.1	40.76 .59	44.1 3.0	46.01 .25	26.2 1.9
Aug. 8.6	70.84 .53	60.2 3.4	41.30 .50	47.3 3.3	46.25 .22	28.1 1.7
18.6	71.31 .40	63.7 3.6	41.75 .39	50.7 3.5	46.45 .18	29.7 1.5
28.5	71.65 .26	67.3 3.7	42.08 .28	54.3 3.7	46.62 .15	31.1 1.3
Sept. 7.5	71.84 +.12	71.1 3.8	42.31 .17	58.0 3.7	46.74 .11	32.4 1.1
17.5	71.88 -.02	74.9 3.8	42.42 +.05	61.8 3.8	46.83 .07	33.3 0.9
27.5	71.79 .16	78.7 3.7	42.41 -.06	65.5 3.7	46.88 +.03	34.1 0.6
Oct. 7.4	71.55 .30	82.3 3.5	42.29 .17	69.1 3.5	46.90 .00	34.6 0.4
17.4	71.19 .45	85.8 3.3	42.06 .28	72.6 3.3	46.89 -.03	35.0 +0.2
27.4	70.69 .55	88.9 3.0	41.73 .38	75.7 3.0	46.85 .05	35.1 0.0
Nov. 6.4	70.08 .66	91.7 2.5	41.30 .47	78.5 2.8	46.79 .07	35.0 -0.1
16.3	69.38 .75	94.0 2.1	40.79 .55	80.9 2.2	46.71 .08	34.8 0.3
26.3	68.59 .82	95.8 1.5	40.21 .61	82.8 1.6	46.62 .09	34.4 0.4
Dec. 6.3	67.74 .87	97.1 1.0	39.57 .66	84.2 1.1	46.52 .10	33.9 0.6
16.2	66.85 .90	97.8 +0.3	38.89 .69	85.0 +0.5	46.41 .11	33.3 0.6
26.2	65.95 .89	97.8 -0.3	38.20 .69	85.2 -0.1	46.31 .10	32.6 0.7
36.2	65.06 -.88	97.2 -0.9	37.51 -.68	84.7 -0.7	46.21 -.10	31.8 -0.8

# 326 SOLAR EPHEMERIS, 1872.

## AT WASHINGTON MEAN AND APPARENT NOON.

Date. 1872.	APPARENT RIGHT ASCENSION.			APPARENT DECLINATION.			Hourly motion. Mean Noon.		Equation of Time for Apparent Noon.	Semi-diameter at Apparent Noon.	Sidereal Time of Semi-d. passing Merid.	Sidereal Time of Mean Noon.				
	Mean Noon.			Mean Noon.			Right Ascen- sion.	Declina- tion.								
	h	m	s	h	m	s										
Jan. 1	18 46	23.56	24.24	23 1	38.5	37.8	11.040	+12.24	+ 3 43.31	16 18.42	11.06	18 42 40.32				
2	18 50	48.37	49.14	22 56	31.1	30.2	11.027	13.37	4 11.58	18.41	11.03	18 46 36.87				
3	18 55	12.85	13.71	22 50	56.4	55.3	11.013	14.51	4 39.51	18.39	10.90	18 50 33.43				
4	18 59	36.97	37.91	22 44	54.4	53.1	10.997	15.64	5 7.08	18.37	10.94	18 54 29.99				
5	19 4	0.71	1.73	22 38	25.2	23.7	10.980	16.77	5 34.26	18.34	10.88	18 58 26.55				
6	19 8	24.02	25.12	22 31	29.1	27.4	10.962	17.89	6 1.02	18.31	10.82	19 2 23.11				
7	19 12	46.88	48.06	22 24	6.3	4.3	10.943	19.00	6 27.33	18.28	10.75	19 6 19.66				
8	19 17	9.26	10.51	22 16	16.9	14.7	10.922	20.10	6 53.15	18.24	10.68	19 10 16.22				
9	19 21	31.11	32.44	22 7	61.3	58.8	10.900	21.19	7 18.45	18.20	10.61	19 14 12.78				
10	19 25	52.43	53.83	21 59	19.7	16.9	10.876	22.26	7 43.22	18.16	10.53	19 18 9.34				
11	19 30	13.17	14.64	21 50	12.5	9.4	10.852	23.33	8 7.41	18.12	10.45	19 22 5.90				
12	19 34	33.32	34.85	21 40	39.7	36.4	10.826	24.39	8 31.01	18.07	10.37	19 26 2.45				
13	19 38	52.84	54.43	21 30	41.7	38.1	10.800	25.44	8 53.97	18.02	10.29	19 29 59.01				
14	19 43	11.72	13.37	21 20	18.8	4.8	10.772	26.47	9 16.29	17.96	10.21	19 33 55.57				
15	19 47	29.92	31.63	21 9	31.1	26.8	10.744	27.49	9 37.93	17.90	10.12	19 37 52.13				
16	19 51	47.42	49.19	20 58	19.2	14.5	10.715	28.49	9 58.88	17.84	10.03	19 41 48.68				
17	19 56	4.21	6.04	20 46	43.3	38.3	10.685	29.49	9 19.11	17.77	9.93	19 45 45.24				
18	20 0	20.27	22.16	20 34	43.8	38.4	10.654	30.47	10 38.61	17.69	9.83	19 49 41.80				
19	20 4	36.59	37.52	20 22	21.0	15.3	10.622	31.43	10 57.37	17.61	9.73	19 53 38.35				
20	20 8	50.15	52.12	20 9	35.2	29.2	10.590	32.38	11 15.37	17.52	9.63	19 57 34.91				
21	20 13	3.94	5.96	19 56	26.9	20.6	10.557	33.31	11 32.60	17.43	9.52	20 1 31.47				
22	20 17	16.95	19.02	19 42	56.3	49.7	10.524	34.23	11 49.06	17.33	9.41	20 5 28.02				
23	20 21	29.17	31.28	19 28	63.7	56.7	10.492	35.14	12 4.72	17.22	9.30	20 9 24.58				
24	20 25	40.59	42.74	19 14	49.6	42.3	10.459	36.03	12 19.58	17.11	9.19	20 13 21.14				
25	20 29	51.22	53.41	19 0	14.4	6.8	10.426	36.90	12 33.64	17.00	9.08	20 17 17.70				
26	20 34	1.06	3.28	18 45	18.4	10.4	10.393	37.76	12 46.91	16.88	8.97	20 21 14.25				
27	20 38	10.09	12.33	18 29	61.9	53.6	10.359	38.60	12 59.39	16.75	8.86	20 25 10.81				
28	20 42	18.32	20.58	18 14	25.4	16.9	10.326	39.43	13 11.07	16.62	8.75	20 29 7.36				
29	20 46	25.75	28.03	17 58	29.3	20.5	10.292	40.24	13 21.93	16.48	8.64	20 33 3.92				
30	20 50	32.37	34.68	17 42	13.9	4.7	10.259	41.04	13 31.98	16.34	8.53	20 37 0.48				
31	20 54	38.19	40.52	17 25	39.5	30.1	10.226	41.82	13 41.25	16.19	8.41	20 40 57.03				
Feb. 1	20 58	43.21	45.56	17 8	46.6	36.9	10.193	42.58	13 49.71	16.04	8.30	20 44 53.58				
2	21 2	47.43	49.79	16 51	35.5	25.5	10.159	43.33	13 57.36	15.88	8.18	20 48 50.14				
3	21 6	50.85	53.22	16 33	66.7	56.5	10.126	44.06	14 4.21	15.72	8.07	20 52 46.70				
4	21 10	53.46	55.84	16 16	20.5	10.1	10.092	44.78	14 10.25	15.55	7.95	20 56 43.26				
5	21 14	55.27	57.66	15 58	17.5	6.7	10.059	45.47	14 15.50	15.38	7.83	21 0 39.61				
6	21 18	56.28	58.67	15 39	57.9	46.9	10.025	46.15	14 19.95	15.21	7.71	21 4 36.37				
7	21 22	56.49	58.88	15 21	28.2	11.0	9.992	46.81	14 23.60	15.04	7.59	21 8 32.92				
8	21 26	55.90	58.29	15 2	30.9	19.5	9.958	47.46	14 26.47	14.86	7.48	21 12 29.48				
9	21 30	54.52	56.91	14 43	24.3	12.7	9.925	48.08	14 28.51	14.68	7.37	21 16 26.03				
10	21 34	52.35	54.74	14 23	62.9	51.2	9.893	48.69	14 29.77	14.50	7.26	21 20 22.59				
11	21 38	49.39	51.77	14 4	27.1	15.3	9.860	49.28	14 30.25	14.32	7.15	21 24 19.14				
12	21 42	45.64	48.01	13 44	37.4	25.5	9.828	49.85	14 29.94	14.13	7.04	21 28 15.70				
13	21 46	41.11	43.47	13 24	34.3	22.2	9.796	50.40	14 28.85	13.94	6.93	21 32 12.25				
14	21 50	35.82	38.17	13 4	18.2	6.0	9.764	50.93	14 26.99	13.74	6.82	21 36 8.81				
15	21 54	29.78	32.12	12 43	40.3	37.0	9.733	51.45	14 24.38	13.55	6.71	21 40 5.36				
16	21 58	22.99	25.31	12 22	68.2	55.8	9.702	51.95	14 21.03	13.35	6.61	21 44 1.92				
17	22 2	15.46	17.76	12 2	15.5	3.0	9.671	52.43	14 16.95	13.14	6.51	21 47 58.47				
18	22 6	7.20	9.48	11 40	71.3	58.8	9.641	52.90	14 12.13	12.94	6.41	21 51 55.02				
19	22 9	58.22	60.48	11 19	56.2	43.7	9.611	53.35	14 6.59	12.73	6.31	21 55 51.58				
20	22 13	48.56	50.80	10 58	30.6	18.1	9.583	53.78	14 0.36	12.52	6.22	21 59 48.13				
21	22 17	38.23	40.45	10 36	54.9	42.4	9.556	54.19	13 53.47	12.30	6.12	22 3 44.69				
22	22 21	27.25	29.45	10 14	69.4	56.8	9.529	54.59	13 45.93	12.09	6.03	22 7 41.24				
23	22 25	15.63	17.80	9 53	14.6	2.0	9.503	54.97	13 37.75	11.85	5.94	22 11 37.80				
24	22 29	3.39	5.53	9 30	70.8	58.3	9.478	55.33	13 28.96	11.62	5.85	22 15 34.35				
25	22 32	50.56	52.67	9 8	58.5	46.1	9.454	55.68	13 19.57	11.39	5.76	22 19 30.90				
26	22 36	37.15	39.23	8 46	38.0	25.7	9.430	56.02	13 9.60	11.15	5.68	22 23 27.46				
27	22 40	23.19	25.24	8 23	69.7	57.5	9.407	56.33	12 59.07	10.91	5.60	22 27 24.01				
28	22 44	8.68	10.69	8 1	34.1	22.0	9.385	56.63	12 48.02	10.66	5.52	22 31 20.56				
29	22 47	53.67	55.64	7 38	51.3	39.4	9.364	56.92	+12 36.45	16 10.41	5.44	22 35 17.12				

NOTE.—For Mean Interval of Semidiameter passing the Meridian, subtract 0s.19 from the Sidereal Interval.

## AT WASHINGTON MEAN AND APPARENT NOON.

Date.	APPARENT RIGHT ASCENSION.		APPARENT DECLINATION.		Hourly motion, Mean Noon.		Equation of Time for Apparent Noon.	Semi-diameter at Apparent Noon.	Sidereal Time of Semid. passing Merid.	Sidereal Time of Mean Noon.
	Mean Noon.	Ap- parent Noon.	Mean Noon.	Ap- parent Noon.	Right Ascension.	Declination.				
1872.										
Mar. 1	22 51 38.16	40.10	7 15 61.9	50.1	9.344	+57.19	+12 24.38	16 10.16	5.37	22 39 13.67
2	22 55 22.18	24.08	6 52 66.2	54.5	9.325	57.44	12 11.84	9.91	5.30	22 43 10.23
3	22 59 5.74	7.60	6 29 64.6	53.0	9.306	57.68	11 58.84	9.65	5.23	22 47 6.78
4	23 2 48.85	50.67	6 6 57.5	46.1	9.288	57.90	11 45.40	9.39	5.16	22 51 3.33
5	23 6 31.54	33.32	5 43 45.2	34.0	9.270	58.11	11 31.54	9.13	5.10	22 54 59.89
6	23 10 13.83	15.57	5 20 28.2	17.2	9.254	58.30	11 17.28	8.87	5.04	22 58 56.44
7	23 13 55.73	57.43	4 56 66.9	56.1	9.238	58.47	11 2.63	8.61	4.98	23 2 52.09
8	23 17 37.26	38.92	4 33 41.7	31.1	9.223	58.62	10 47.60	8.35	4.92	23 6 49.54
9	23 21 18.42	20.04	4 10 12.9	2.5	9.208	58.76	10 32.21	8.08	4.87	23 10 46.10
10	23 24 59.25	60.82	3 46 41.0	30.8	9.194	58.88	10 16.49	7.82	4.82	23 14 42.65
11	23 28 39.75	41.28	3 22 66.3	56.4	9.181	58.99	10 0.44	7.56	4.78	23 18 39.20
12	23 32 19.95	21.44	2 59 29.3	19.7	9.168	59.08	9 44.08	7.30	4.74	23 22 35.76
13	23 35 59.85	61.30	2 35 50.4	41.0	9.156	59.15	9 27.43	7.03	4.70	23 26 32.31
14	23 39 39.48	40.88	2 12 10.0	0.9	9.145	59.21	9 10.51	6.77	4.66	23 30 28.87
15	23 43 18.85	20.20	1 48 28.4	19.6	9.135	59.25	8 53.33	6.51	4.63	23 34 25.41
16	23 46 57.99	59.30	1 24 46.1	37.6	9.126	59.27	8 35.91	6.25	4.60	23 38 21.97
17	23 50 36.91	38.18	1 0 63.4	55.1	9.117	59.28	8 18.28	5.98	4.57	23 42 18.53
18	23 54 15.64	16.86	0 37 20.6	12.6	9.110	59.27	8 0.47	5.71	4.54	23 46 15.08
19	23 57 54.20	55.37	0 13 38.3	30.6	9.103	59.25	7 42.48	5.44	4.52	23 50 11.63
20	0 1 32.60	33.72	+ 0 10 3.3	10.6	9.098	59.21	7 24.33	5.17	4.50	23 54 8.18
21	0 5 10.88	11.96	0 33 43.9	50.9	9.093	59.16	7 6.05	4.90	4.49	23 58 4.74
22	0 8 49.06	50.99	0 57 23.1	29.8	9.089	59.09	6 47.68	4.63	4.48	0 2 1.29
23	0 12 27.15	28.13	1 21 0.4	6.9	9.086	59.01	6 29.22	4.35	4.47	0 5 57.84
24	0 16 5.18	6.12	1 44 35.7	41.9	9.084	58.91	6 10.70	4.08	4.46	0 9 54.40
25	0 19 43.19	44.08	2 8 8.5	14.3	9.083	58.81	5 52.16	3.80	4.46	0 13 50.95
26	0 23 21.19	22.03	2 31 38.6	44.1	9.083	58.69	5 33.62	3.52	4.46	0 17 47.50
27	0 26 59.20	59.99	2 55 5.7	10.9	9.084	58.56	5 15.08	3.24	4.47	0 21 44.05
28	0 30 37.25	38.00	3 18 29.4	34.3	9.086	58.41	4 56.57	2.96	4.47	0 25 40.60
29	0 34 15.35	16.06	3 41 49.4	54.0	9.089	58.25	4 38.13	2.67	4.48	0 29 37.16
30	0 37 53.54	54.20	4 5 5.4	9.7	9.093	58.06	4 19.77	2.39	4.49	0 33 33.71
31	0 41 31.83	32.44	4 28 16.9	20.8	9.098	57.86	4 1.51	2.10	4.50	0 37 30.26
Apr. 1	0 45 10.24	10.81	4 51 23.7	27.3	9.103	57.64	3 43.37	1.82	4.52	0 41 26.82
2	0 48 48.79	49.82	5 14 25.4	28.7	9.109	57.41	3 25.38	1.53	4.54	0 45 23.37
3	0 52 27.50	27.98	5 37 21.7	24.8	9.116	57.19	3 7.54	1.25	4.56	0 49 19.92
4	0 56 6.38	6.82	6 0 12.2	14.9	9.124	56.96	2 49.87	0.97	4.58	0 53 16.48
5	0 59 45.46	45.85	6 22 56.6	59.0	9.132	56.71	2 32.40	0.69	4.61	0 57 13.03
6	1 3 24.74	25.08	6 45 34.6	36.8	9.141	56.44	2 15.13	0.41	4.64	1 1 9.58
7	1 7 4.24	4.53	7 8 5.8	7.8	9.150	56.15	1 58.08	0.13	4.67	1 5 6.14
8	1 10 43.97	44.22	7 30 29.8	31.5	9.160	55.84	1 41.26	15 50.86	4.71	1 9 2.69
9	1 14 23.95	24.16	7 52 46.2	47.5	9.171	55.51	1 24.69	59.59	4.75	1 12 59.24
10	1 18 4.20	4.37	8 14 54.6	55.7	9.182	55.17	1 8.39	59.32	4.79	1 16 55.80
11	1 21 44.73	44.86	8 36 54.6	55.4	9.194	54.82	0 52.37	59.05	4.83	1 20 52.35
12	1 25 25.54	25.63	8 58 46.0	46.6	9.206	54.45	0 36.63	58.79	4.87	1 24 48.90
13	1 29 6.66	6.71	9 20 28.4	28.7	9.219	54.07	0 21.19	58.52	4.92	1 28 45.46
14	1 32 48.09	48.10	9 42 1.3	1.5	9.233	53.67	+ 0 6.07	58.26	4.98	1 32 42.01
15	1 36 29.86	29.83	10 3 24.6	24.5	9.247	53.26	- 0 8.71	58.00	5.03	1 36 38.57
16	1 40 11.97	11.91	10 24 37.8	37.5	9.262	52.84	0 23.15	57.74	5.09	1 40 35.12
17	1 43 54.45	54.35	10 45 40.7	40.2	9.278	52.39	0 37.23	57.48	5.14	1 44 31.67
18	1 47 37.30	37.16	11 6 32.7	32.0	9.294	51.94	0 50.92	57.23	5.20	1 48 28.23
19	1 51 20.55	20.38	11 27 13.6	12.7	9.311	51.47	1 4.22	56.97	5.26	1 52 24.78
20	1 55 4.21	4.01	11 47 43.2	42.2	9.328	50.99	1 17.12	56.72	5.33	1 56 21.34
21	1 58 48.30	48.07	12 7 61.1	59.9	9.347	50.50	1 29.58	56.46	5.39	2 0 17.89
22	2 2 32.83	22.57	12 28 7.2	5.8	9.366	50.00	1 41.59	56.21	5.46	2 4 14.45
23	2 6 17.82	17.53	12 47 61.0	59.4	9.385	49.48	1 53.16	55.95	5.53	2 8 11.00
24	2 10 3.28	2.96	13 7 42.2	40.5	9.405	48.95	2 4.26	55.70	5.60	2 12 7.56
25	2 13 49.23	48.88	13 27 10.5	8.7	9.425	48.40	2 14.86	55.45	5.67	2 16 4.11
26	2 17 35.68	35.30	13 46 25.4	23.5	9.446	47.84	2 24.96	55.20	5.74	2 20 0.66
27	2 21 22.64	22.24	14 5 26.8	24.9	9.468	47.28	2 34.55	54.95	5.81	2 23 57.22
28	2 25 10.14	9.71	14 24 14.6	12.6	9.490	46.70	2 43.61	54.71	5.89	2 27 53.77
29	2 28 58.17	57.72	14 42 48.3	46.1	9.513	46.10	2 52.14	54.46	5.96	2 31 50.33
30	2 32 46.75	46.28	15 1 7.5	5.3	9.536	45.49	3 0.12	54.22	6.04	2 35 46.88
31	2 36 35.88	35.39	+15 19 12.0	9.7	9.559	+44.87	- 3 7.54	15 53.98	6.11	2 39 43.44

NOTE.—For Mass interval of Semidiameter passing the Meridian, subtract 0.18 from the Sidereal Interval.

# 328 SOLAR EPHEMERIS, 1872.

## AT WASHINGTON MEAN AND APPARENT NOON.

Date.	APPARENT RIGHT ASCENSION.		APPARENT DECLINATION.		Hourly motion.		Equation of Time for Apparent Noon.	Semi-diameter at Apparent Noon.	Sidereal Time of Semid. passing Merid.	Sidereal Time of Mean Noon.				
	Mean Noon.	Apparent Noon.	Mean Noon.	Apparent Noon.	Right Ascension.	Declination.								
1872.	h m s	h m s	° ' "	° ' "	° ' "	° ' "	m s	' "	m s	h m s				
May 1	2 36 35.88	35.39	+15 19 12.0	9.7	9.559	+44.87	- 3 7.54	15 53.98	6.11	2 39 43.44				
2	2 40 25.57	25.06	15 36 61.5	59.2	9.582	44.24	3 14.40	53.74	6.19	2 43 39.99				
3	2 44 15.83	15.30	15 54 35.6	33.2	9.606	43.59	3 20.70	53.50	6.27	2 47 36.55				
4	2 48 6.66	6.11	16 11 54.1	51.6	9.630	42.93	3 26.43	53.27	6.35	2 51 33.11				
5	2 51 58.06	57.50	16 28 56.5	54.0	9.654	42.26	3 31.59	53.04	6.43	2 55 29.66				
6	2 55 50.04	49.46	16 45 42.6	40.1	9.678	41.57	3 36.17	52.82	6.51	2 59 26.22				
7	2 59 42.58	41.99	17 2 12.0	9.5	9.702	40.87	3 40.18	52.60	6.59	3 3 22.77				
8	3 3 35.70	35.10	17 18 24.4	21.9	9.725	40.16	3 43.62	52.38	6.68	3 7 19.33				
9	3 7 29.39	28.78	17 34 19.5	17.0	9.749	39.43	3 46.49	52.17	6.76	3 11 15.88				
10	3 11 23.64	23.02	17 49 56.9	54.4	9.772	38.69	3 48.80	51.96	6.84	3 15 12.44				
11	3 15 18.46	17.83	18 5 16.4	13.9	9.796	37.94	3 50.54	51.75	6.92	3 19 9.00				
12	3 19 13.84	13.21	18 20 17.6	15.2	9.819	37.17	3 51.71	51.55	7.01	3 23 5.55				
13	3 23 9.78	9.15	18 34 60.4	58.1	9.842	36.39	3 52.33	51.35	7.09	3 27 2.11				
14	3 27 6.28	5.64	18 49 24.3	22.0	9.865	35.60	3 52.39	51.16	7.17	3 30 58.67				
15	3 31 3.33	2.69	19 3 29.0	26.8	9.888	34.79	3 51.89	50.97	7.25	3 34 55.22				
16	3 35 0.93	0.29	19 17 14.2	12.1	9.911	33.97	3 50.84	50.78	7.34	3 38 51.78				
17	3 38 50.08	58.45	19 30 39.8	37.7	9.934	33.15	3 49.25	50.60	7.42	3 42 48.33				
18	3 42 57.77	57.14	19 43 45.4	43.3	9.956	32.32	3 47.13	50.42	7.50	3 46 44.89				
19	3 46 56.99	56.37	19 56 31.0	28.9	9.979	31.48	3 44.47	50.24	7.58	3 50 41.45				
20	3 50 56.75	56.13	20 8 56.1	54.2	10.001	30.62	3 41.27	50.07	7.66	3 54 38.01				
21	3 54 57.04	56.43	20 20 60.6	58.8	10.023	29.76	3 37.54	49.90	7.74	3 58 34.56				
22	3 58 57.85	57.26	20 32 44.3	42.6	10.044	28.88	3 33.28	49.73	7.81	4 2 31.12				
23	4 2 59.19	58.61	20 44 7.0	5.4	10.066	28.00	3 28.50	49.56	7.88	4 6 27.68				
24	4 7 1.05	0.48	20 55 8.3	6.7	10.088	27.10	3 23.19	49.40	7.95	4 10 24.23				
25	4 11 3.42	2.87	21 5 48.0	46.5	10.109	26.20	3 17.38	49.23	8.02	4 14 20.79				
26	4 15 6.29	5.76	21 16 6.0	4.6	10.130	25.29	3 11.07	49.07	8.09	4 18 17.35				
27	4 19 9.65	9.14	21 26 2.1	0.8	10.150	24.37	3 4.27	48.91	8.16	4 22 13.90				
28	4 23 13.50	13.00	21 35 36.0	34.9	10.170	23.45	2 56.98	48.76	8.22	4 26 10.46				
29	4 27 17.81	17.33	21 44 47.6	46.6	10.189	22.51	2 49.23	48.61	8.28	4 30 7.02				
30	4 31 22.58	22.12	21 53 36.7	35.7	10.208	21.57	2 41.02	48.46	8.34	4 34 3.58				
31	4 35 27.79	27.35	22 2 3.1	2.2	10.226	20.62	2 32.36	48.32	8.40	4 38 0.13				
June 1	4 39 33.43	33.02	22 10 6.5	5.7	10.243	19.66	2 23.28	48.18	8.45	4 41 56.69				
2	4 43 39.48	39.10	22 17 46.8	46.1	10.259	18.69	2 13.79	48.05	8.51	4 45 53.25				
3	4 47 45.90	45.54	22 25 3.9	3.3	10.275	17.72	2 3.93	47.92	8.56	4 49 49.81				
4	4 51 52.69	52.36	22 31 57.5	57.0	10.290	16.74	1 53.70	47.79	8.61	4 53 46.37				
5	4 55 59.84	59.54	22 38 27.4	26.9	10.304	15.75	1 43.11	47.67	8.65	4 57 42.92				
6	5 0 7.30	7.03	22 44 33.5	33.1	10.316	14.76	1 32.19	47.56	8.70	5 1 39.48				
7	5 4 15.05	14.81	22 50 15.7	15.4	10.328	13.76	1 20.99	47.45	8.74	5 5 36.04				
8	5 8 23.08	22.87	22 55 33.9	33.7	10.339	12.75	1 9.53	47.35	8.78	5 9 32.60				
9	5 12 31.35	31.17	23 0 27.9	27.7	10.349	11.74	0 57.82	47.25	8.81	5 13 29.16				
10	5 16 39.85	39.71	23 4 57.6	57.4	10.358	10.73	0 45.87	47.16	8.84	5 17 25.71				
11	5 20 48.55	48.45	23 9 2.8	2.7	10.366	9.71	0 33.72	47.07	8.87	5 21 22.27				
12	5 24 57.42	57.36	23 12 43.5	43.4	10.373	8.69	0 21.41	46.99	8.89	5 25 18.83				
13	5 29 6.44	6.41	23 15 59.6	59.6	10.379	7.66	- 0 8.95	46.91	8.91	5 29 15.39				
14	5 33 15.59	15.60	23 18 51.1	51.1	10.383	6.63	+ 0 3.64	46.83	8.93	5 33 11.95				
15	5 37 24.84	24.89	23 21 17.9	17.9	10.387	5.60	0 16.34	46.76	8.95	5 37 8.50				
16	5 41 34.18	34.27	23 23 20.0	20.0	10.390	4.57	0 29.11	46.69	8.96	5 41 5.07				
17	5 45 43.58	43.70	23 24 57.4	57.5	10.393	3.54	0 41.96	46.63	8.97	5 45 1.62				
18	5 49 53.03	53.19	23 26 10.0	10.1	10.394	2.51	0 54.86	46.57	8.97	5 48 58.18				
19	5 54 2.49	2.69	23 26 57.8	57.9	10.394	1.48	1 7.76	46.52	8.97	5 52 54.74				
20	5 58 11.96	12.20	23 27 30.9	20.9	10.394	+ 0.45	1 20.67	46.47	8.97	5 56 51.30				
21	6 2 21.41	21.69	23 27 19.1	19.1	10.394	- 0.59	1 33.56	46.42	8.97	6 0 47.86				
22	6 6 30.82	31.13	23 26 52.5	52.5	10.392	1.62	1 46.43	46.37	8.97	6 4 44.41				
23	6 10 40.17	40.52	23 26 1.2	1.1	10.389	2.65	1 59.22	46.33	8.96	6 8 40.97				
24	6 14 49.45	49.84	23 24 45.2	45.0	10.385	3.68	2 11.94	46.29	8.95	6 12 37.53				
25	6 18 58.63	59.06	23 23 4.5	4.3	10.380	4.71	2 24.56	46.25	8.93	6 16 34.09				
26	6 23 7.70	8.17	23 20 59.2	59.0	10.374	5.74	2 37.07	46.22	8.91	6 20 30.65				
27	6 27 16.62	17.12	23 18 29.3	29.0	10.368	6.76	2 49.44	46.19	8.89	6 24 27.20				
28	6 31 25.39	25.92	23 15 34.9	34.5	10.361	7.78	3 1.66	46.16	8.87	6 28 23.76				
29	6 35 33.98	34.55	23 12 16.1	15.6	10.353	8.79	3 13.69	46.14	8.84	6 32 20.32				
30	6 39 42.36	42.96	23 8 32.9	32.3	10.344	9.81	3 25.51	46.13	8.80	6 36 16.88				
31	6 43 50.51	51.14	+23 4 25.4	24.8	10.334	-10.82	+ 3 37.10	15 46.12	8.76	6 40 13.44				

NOTE.—For Mean interval of Semidiameter passing the Meridian, subtract 0.18 from the Sidereal Interval.

# SOLAR EPHEMERIS, 1872.

329

## AT WASHINGTON MEAN AND APPARENT NOON.

Date.	APPARENT RIGHT ASCENSION.		APPARENT DECLINATION.		Hourly motion, Mean Noon.		Equation of Time for Apparent Noon.	Semi-diameter at Apparent Noon.	Sidereal Time of Semid. passing Merid.	Sidereal Time of Mean Noon.
	Mean Noon.	Apparent Noon.	Mean Noon.	Apparent Noon.	Right Ascension.	Declination.				
1872.	h m s	h m s	° ' "	° ' "	° ' "	° ' "	m s	h m s	m s	h m s
July 1	6 43 50.51	51.14	+23 4 25.4	24.8	10.334	-10.82	+ 3 37.10	15 46.12	1 8.76	6 40 13.44
2	6 47 58.41	59.07	22 59 53.7	53.0	10.323	11.83	3 48.45	46.11	8.72	6 44 9.99
3	6 52 6.04	6.73	22 54 57.8	57.0	10.311	12.83	3 59.52	46.11	8.67	6 48 6.55
4	6 56 13.38	14.10	22 49 38.0	37.1	10.298	13.82	4 10.30	46.11	8.63	6 52 3.11
5	7 0 20.37	21.13	22 43 54.3	53.3	10.284	14.81	4 20.73	46.13	8.58	6 55 59.67
6	7 4 27.02	27.80	22 37 46.9	45.8	10.270	15.80	4 30.82	46.15	8.53	6 59 56.23
7	7 8 33.30	34.10	22 31 15.9	14.6	10.254	16.78	4 40.54	46.17	8.48	7 3 52.79
8	7 12 39.19	40.01	22 24 21.5	20.1	10.237	17.75	4 49.88	46.20	8.43	7 7 49.34
9	7 16 44.66	45.50	22 17 3.9	2.4	10.219	18.71	4 58.79	46.24	8.37	7 11 45.90
10	7 20 49.70	50.56	22 9 23.3	21.7	10.200	19.67	5 7.27	46.28	8.31	7 15 42.46
11	7 24 54.28	55.16	22 1 19.9	18.2	10.181	20.62	5 15.29	46.32	8.25	7 19 39.02
12	7 28 58.39	59.29	21 52 53.7	51.9	10.161	21.56	5 22.85	46.37	8.19	7 23 35.58
13	7 33 2.01	2.93	21 44 5.0	3.0	10.140	22.49	5 29.90	46.43	8.12	7 27 32.14
14	7 37 5.13	6.07	21 34 54.1	51.9	10.119	23.41	5 36.46	46.49	8.05	7 31 28.69
15	7 41 7.74	8.70	21 25 21.2	18.9	10.098	24.33	5 42.51	46.55	7.98	7 35 25.25
16	7 45 9.83	10.80	21 15 26.4	24.0	10.076	25.23	5 48.05	46.61	7.91	7 39 21.80
17	7 49 11.38	12.36	21 5 10.0	7.5	10.053	26.13	5 53.04	46.68	7.83	7 43 18.36
18	7 53 12.39	13.38	20 54 32.3	29.7	10.030	27.01	5 57.49	46.75	7.76	7 47 14.92
19	7 57 12.84	13.84	20 43 33.4	30.7	10.007	27.89	6 1.38	46.83	7.69	7 51 11.48
20	8 1 12.74	13.75	20 32 13.6	10.8	9.984	28.75	6 4.71	46.91	7.60	7 55 8.04
21	8 5 12.09	13.11	20 20 33.2	30.2	9.961	29.61	6 7.50	46.99	7.52	7 59 4.59
22	8 9 10.88	11.90	20 8 32.3	29.1	9.938	30.45	6 9.74	47.08	7.44	8 3 1.15
23	8 13 9.09	10.12	19 56 11.2	7.9	9.914	31.29	6 11.40	47.17	7.35	8 6 57.70
24	8 17 6.73	7.76	19 43 30.1	26.8	9.890	32.13	6 12.47	47.26	7.27	8 10 54.26
25	8 21 3.79	4.82	19 30 29.4	26.0	9.866	32.94	6 12.97	47.36	7.19	8 14 50.82
26	8 25 0.29	1.31	19 17 9.2	5.7	9.842	33.74	6 12.92	47.46	7.11	8 18 47.37
27	8 28 56.21	57.23	19 3 29.8	26.2	9.818	34.54	6 12.29	47.56	7.02	8 22 43.93
28	8 32 51.55	52.56	18 59 31.4	27.7	9.794	35.32	6 11.06	47.67	6.94	8 26 40.49
29	8 36 46.31	47.31	18 35 14.5	10.5	9.770	36.09	6 9.26	47.78	6.85	8 30 37.04
30	8 40 40.49	41.48	18 20 39.1	35.3	9.745	36.85	6 6.88	47.89	6.76	8 34 33.60
31	8 44 34.07	35.06	18 5 45.6	41.8	9.720	37.60	6 3.90	48.01	6.67	8 38 30.16
Aug. 1	8 48 27.06	28.04	17 50 34.3	30.4	9.695	38.33	6 0.33	48.13	6.58	8 42 26.71
2	8 52 19.45	20.41	17 35 5.4	1.5	9.671	39.06	5 56.16	48.26	6.50	8 46 23.27
3	8 56 11.25	12.19	17 19 19.3	15.4	9.646	39.77	5 51.41	48.40	6.41	8 50 19.82
4	9 0 2.45	3.38	17 3 16.3	12.4	9.621	40.47	5 46.05	48.54	6.32	8 54 16.38
5	9 3 53.05	53.96	16 46 56.7	52.8	9.596	41.15	5 40.09	48.69	6.23	8 58 12.93
6	9 7 43.05	43.94	16 30 30.8	16.9	9.571	41.83	5 43.53	48.84	6.15	9 2 9.49
7	9 11 32.46	33.38	16 13 28.9	25.0	9.546	42.48	5 36.38	48.99	6.06	9 6 6.05
8	9 15 21.26	22.11	15 56 21.3	17.4	9.521	43.13	5 18.62	49.15	5.98	9 10 2.61
9	9 19 9.47	10.29	15 38 58.3	54.5	9.496	43.76	5 10.28	49.31	5.89	9 13 59.16
10	9 22 57.09	57.89	15 21 20.3	16.6	9.472	44.39	5 1.34	49.48	5.81	9 17 55.72
11	9 26 44.13	44.90	15 3 27.6	24.0	9.448	44.99	4 51.83	49.65	5.73	9 21 52.27
12	9 30 30.58	31.32	14 45 20.5	17.0	9.424	45.59	4 41.73	49.83	5.65	9 25 48.82
13	9 34 16.47	17.18	14 26 59.4	56.0	9.401	46.16	4 31.06	50.01	5.57	9 29 45.38
14	9 38 1.80	2.48	14 8 24.6	21.3	9.378	46.73	4 19.83	50.20	5.49	9 33 41.94
15	9 41 46.59	47.24	13 49 36.4	33.1	9.355	47.28	4 8.07	50.38	5.41	9 37 38.49
16	9 45 30.84	31.45	13 30 35.0	31.8	9.333	47.83	3 55.76	50.57	5.34	9 41 35.05
17	9 49 14.57	15.14	13 11 20.7	17.7	9.312	48.35	3 42.94	50.76	5.26	9 45 31.60
18	9 52 57.80	58.33	12 51 54.1	51.2	9.291	48.86	3 29.61	50.95	5.19	9 49 28.16
19	9 56 40.54	41.04	12 32 15.2	12.4	9.271	49.36	3 15.80	51.14	5.12	9 53 24.71
20	10 0 22.81	23.27	12 12 24.4	21.8	9.251	49.86	3 1.51	51.33	5.05	9 57 21.27
21	10 4 4.61	5.04	11 52 21.9	19.5	9.232	50.33	2 46.76	51.53	4.98	10 1 17.82
22	10 7 45.97	46.36	11 32 8.2	6.1	9.214	50.80	2 31.56	51.73	4.92	10 5 14.38
23	10 11 26.91	27.26	11 11 43.5	41.6	9.197	51.25	2 15.95	51.93	4.86	10 9 10.93
24	10 15 7.43	7.74	10 51 8.9	6.3	9.180	51.69	1 59.92	52.14	4.80	10 13 7.49
25	10 18 47.57	47.84	10 30 22.1	20.5	9.164	52.12	1 43.59	52.35	4.74	10 17 4.04
26	10 22 27.33	27.56	10 9 26.0	24.7	9.148	52.54	1 26.71	52.56	4.69	10 21 0.60
27	10 26 6.73	6.91	9 48 20.2	19.1	9.133	52.94	1 9.57	52.77	4.63	10 24 57.15
28	10 29 45.77	45.90	9 27 4.8	4.0	9.119	53.33	0 52.06	52.99	4.58	10 28 53.70
29	10 33 24.48	24.57	9 5 40.3	39.7	9.106	53.70	0 34.21	53.21	4.53	10 32 50.26
30	10 37 2.87	2.92	8 44 6.9	6.6	9.093	54.06	+ 0 16.06	53.43	4.48	10 36 46.81
31	10 40 40.95	40.96	8 22 25.0	25.0	9.080	-54.41	- 0 2.42	53.65	4.43	10 40 43.37

NOTE.—For Mean interval of Semidiameter passing the Meridian, subtract 0.18 from the Sidereal Interval



# 330 SOLAR EPHEMERIS, 1872.

## AT WASHINGTON MEAN AND APPARENT NOON.

Date. 1872.	APPARENT RIGHT ASCENSION.			APPARENT DECLINATION.			Hourly motion. Mean Noon.		Equation of Time for Apparent Noon.	Semi-diameter at Apparent Noon.	Sidereal Time of Semid. passing Merid.	Sidereal Time of Mean Noon.
	Mean Noon.	Ap- parent Noon.		Mean Noon.	Ap- parent Noon.		Right Ascen- sion.	Declina- tion.				
Sept. 1	h m s	18 69	+	0 0 35.0	35.2	9.068	-54.74	0 21.18	15 53.88	1 4.38	10 44 39.92	
2	10 44 18.74	56.15		7 38 37.2	37.7	9.057	55.06	0 40.21	54.11	4.34	10 48 36.47	
3	10 51 33.49	33.34		7 16 31.8	32.7	9.046	55.37	0 59.52	54.35	4.30	10 52 33.03	
4	10 55 10.48	10.98		6 54 19.3	20.5	9.036	55.66	1 19.08	54.59	4.26	10 56 29.58	
5	10 58 47.23	46.98		6 32 0.1	1.6	9.027	55.94	1 38.88	54.84	4.23	11 0 26.13	
6	11 2 23.76	23.46		6 9 34.4	36.2	9.018	56.20	1 58.90	55.09	4.20	11 4 22.69	
7	11 5 60.08	59.73		5 47 2.6	4.7	9.009	56.44	2 19.13	55.34	4.17	11 8 19.24	
8	11 9 36.21	35.81		5 24 25.1	27.5	9.002	56.67	2 39.54	55.59	4.14	11 12 15.79	
9	11 13 12.16	11.72		5 1 42.2	44.9	8.995	56.89	3 0.13	55.85	4.12	11 16 12.34	
10	11 16 47.97	47.47		4 38 54.3	57.4	8.989	57.09	3 20.88	56.11	4.10	11 20 8.90	
11	11 20 23.64	23.08		4 16 1.6	5.1	8.984	57.28	3 41.77	56.37	4.08	11 24 5.46	
12	11 23 59.19	58.58		3 53 4.6	8.4	8.979	57.46	4 2.77	56.63	4.07	11 28 2.01	
13	11 27 34.64	33.98		3 30 3.5	7.7	8.975	57.62	4 23.86	56.89	4.06	11 31 58.56	
14	11 31 10.02	9.31		3 6 58.7	63.2	8.973	57.77	4 45.02	57.15	4.06	11 35 55.11	
15	11 34 45.35	44.59		2 43 50.5	55.3	8.971	57.91	5 6.25	57.42	4.06	11 39 51.67	
16	11 38 20.65	19.84		2 20 39.2	44.4	8.971	58.03	5 27.49	57.68	4.06	11 43 48.22	
17	11 41 55.95	55.09		1 57 25.2	30.7	8.971	58.14	5 48.74	57.95	4.06	11 47 44.77	
18	11 45 31.28	30.36		1 34 8.7	14.6	8.972	58.23	6 9.96	58.21	4.06	11 51 41.33	
19	11 49 6.64	5.66		1 10 50.0	56.2	8.974	58.32	6 31.15	58.48	4.07	11 55 37.88	
20	11 52 42.07	41.04		0 47 29.5	36.1	8.978	58.38	6 52.27	58.74	4.08	11 59 34.43	
21	11 56 17.60	16.52		0 24 7.4	14.4	8.982	58.44	7 13.28	59.01	4.10	12 3 30.98	
22	11 59 53.24	52.11	+	0 0 44.1	51.4	8.988	58.48	7 34.19	59.27	4.11	12 7 27.54	
23	12 3 29.01	27.83	-	0 22 40.1	32.5	8.994	58.52	7 54.96	59.54	4.13	12 11 24.09	
24	12 7 4.95	3.71		0 45 64.9	57.0	9.001	58.53	8 15.57	59.80	4.15	12 15 20.64	
25	12 10 41.06	39.77		1 9 29.9	21.6	9.009	58.54	8 36.02	60.07	4.18	12 19 17.20	
26	12 14 17.37	16.03		1 32 54.8	46.2	9.018	58.53	8 56.26	60.34	4.21	12 23 13.75	
27	12 17 53.90	52.51		1 56 19.3	10.4	9.027	58.50	9 16.28	60.61	4.24	12 27 10.31	
28	12 21 30.67	29.23		2 19 43.0	33.7	9.037	58.45	9 36.06	60.88	4.27	12 31 6.86	
29	12 25 7.69	6.20		2 42 65.6	56.0	9.048	58.40	9 55.58	61.15	4.31	12 35 3.41	
30	12 28 44.99	43.45		3 6 26.6	16.7	9.060	58.33	10 14.83	61.42	4.35	12 38 59.96	
Oct. 1	12 32 22.58	20.99		3 29 45.6	35.5	9.072	58.24	10 33.80	61.70	4.39	12 42 56.52	
2	12 35 60.48	58.84		3 52 62.3	51.9	9.085	58.13	10 52.45	61.98	4.44	12 46 53.07	
3	12 39 38.70	37.01		4 16 16.4	5.7	9.099	58.02	11 10.78	62.26	4.49	12 50 49.62	
4	12 43 17.27	15.53		4 39 27.4	16.4	9.114	57.88	11 28.77	62.54	4.54	12 54 46.18	
5	12 46 56.19	54.40		5 2 35.0	23.7	9.129	57.73	11 46.40	62.82	4.60	12 58 42.73	
6	12 50 35.48	33.64		5 25 38.7	27.2	9.145	57.56	12 3.66	63.10	4.66	13 2 39.28	
7	12 54 15.17	13.28		5 48 38.1	26.3	9.161	57.38	12 20.53	63.38	4.72	13 6 35.84	
8	12 57 55.27	53.34		6 11 32.9	20.9	9.179	57.18	12 36.98	63.66	4.79	13 10 32.39	
9	13 1 35.79	33.81		6 34 22.7	10.5	9.197	56.96	12 53.01	63.95	4.86	13 14 28.94	
10	13 5 16.76	14.74		6 56 67.1	54.8	9.217	56.73	13 8.60	64.23	4.93	13 18 25.50	
11	13 8 58.20	56.13		7 19 45.7	33.2	9.237	56.48	13 23.71	64.52	5.00	13 22 22.05	
12	13 12 40.13	58.02		7 42 18.2	5.5	9.258	56.22	13 38.33	64.80	5.07	13 26 18.60	
13	13 16 22.56	20.41		8 4 44.2	31.3	9.279	55.94	13 52.46	65.08	5.15	13 30 15.16	
14	13 20 5.51	3.32		8 26 63.3	50.3	9.301	55.65	14 6.07	65.36	5.23	13 34 11.71	
15	13 23 49.02	46.79		8 49 15.3	2.9	9.324	55.34	14 19.12	65.64	5.31	13 38 8.27	
16	13 27 33.11	30.84		9 11 19.7	6.4	9.348	55.00	14 31.59	65.91	5.40	13 42 4.82	
17	13 31 17.77	15.46		9 33 16.1	2.7	9.374	54.67	14 43.48	66.18	5.49	13 46 1.37	
18	13 35 3.04	0.70		9 54 64.1	50.6	9.400	54.32	14 54.77	66.45	5.58	13 49 57.93	
19	13 38 48.95	46.58		10 16 43.5	29.9	9.427	53.95	15 5.42	66.71	5.67	13 53 54.48	
20	13 42 35.51	33.11		10 38 13.9	0.3	9.455	53.57	15 15.43	66.98	5.76	13 57 51.04	
21	13 46 22.73	20.29		10 59 34.9	21.3	9.483	53.17	15 24.76	67.24	5.86	14 1 47.59	
22	13 50 10.64	8.17		11 20 46.2	32.5	9.512	52.75	15 33.41	67.50	5.96	14 5 44.14	
23	13 53 59.26	56.76		11 41 47.2	33.5	9.541	52.31	15 41.35	67.76	6.06	14 9 40.70	
24	13 57 48.61	46.08		12 2 37.8	24.1	9.571	51.87	15 48.54	68.02	6.16	14 13 37.25	
25	14 1 38.68	36.13		12 23 17.3	3.7	9.601	51.41	15 55.06	68.27	6.27	14 17 33.81	
26	14 5 29.49	26.93		12 43 45.6	32.0	9.633	50.93	16 0.81	68.53	6.37	14 21 30.36	
27	14 9 21.07	18.49		13 3 62.0	48.5	9.665	50.43	16 5.79	68.78	6.48	14 25 26.92	
28	14 13 13.42	10.82		13 23 66.3	52.9	9.697	49.91	16 10.00	69.03	6.59	14 29 23.47	
29	14 17 6.54	3.92		13 43 58.0	44.7	9.730	49.38	16 13.44	69.28	6.70	14 33 20.03	
30	14 20 60.45	57.81		14 3 36.7	23.4	9.763	48.83	16 16.10	69.53	6.81	14 37 16.58	
31	14 24 55.16	52.50		14 22 61.9	48.8	9.796	48.26	16 17.96	69.78	6.93	14 41 13.14	
32	14 28 50.66	47.99	-	14 42 13.2	0.2	9.829	-47.67	-16 19.02	70.03	7.04	14 45 9.69	

NOTE.—For Mean interval of Semidiameter passing the Meridian, subtract 0.18 from the Sidereal Interval.

## AT WASHINGTON MEAN AND APPARENT NOON.

Date.	APPARENT RIGHT ASCENSION.		APPARENT DECLINATION.		Hourly motion, Mean Noon.		Equation of Time for Apparent Noon.	Semi-diameter at Apparent Noon.	Sidereal Time of Semid. passing Merid.	Sidereal Time of Mean Noon.
	Mean Noon.	Ap- parent Noon.	Mean Noon.	Ap- parent Noon.	Right Ascen- sion.	Declina- tion.				
1872.	h m s	h m s	° ' "	° ' "	° ' "	° ' "	m s	h m s	h m s	h m s
Nov. 1	14 28 50.66	47.59	14 42 13.2	0.2	9.829	-47.67	-16 19.02	16 10.03	7.04	14 45 9.69
2	14 32 46.97	44.29	15 0 70.1	57.3	9.863	-47.06	16 19.27	10.28	7.16	14 49 6.25
3	14 36 44.09	41.40	15 19 52.3	39.7	9.897	-46.44	16 18.71	10.53	7.27	14 53 2.80
4	14 40 42.02	39.32	15 38 19.3	6.8	9.931	-45.80	16 17.35	10.77	7.39	14 56 59.36
5	14 44 40.76	38.06	15 56 30.7	18.4	9.965	-45.14	16 15.18	11.01	7.51	15 0 55.91
6	14 48 40.32	37.62	16 14 26.0	13.9	9.999	-44.46	16 12.19	11.25	7.63	15 4 52.47
7	14 52 40.70	38.00	16 31 64.9	53.1	10.033	-43.77	16 8.38	11.49	7.75	15 8 49.02
8	14 56 41.90	39.20	16 49 26.9	15.3	10.068	-43.06	16 3.74	11.73	7.87	15 12 45.58
9	15 0 43.94	41.25	17 6 31.7	20.4	10.102	-42.34	15 58.26	11.97	7.99	15 16 42.14
10	15 4 46.81	44.13	17 23 18.8	7.8	10.137	-42.61	15 51.95	12.20	8.11	15 20 38.69
11	15 8 50.51	47.84	17 39 47.9	37.1	10.171	-41.84	15 44.82	12.43	8.23	15 24 35.25
12	15 12 55.04	52.38	17 55 58.5	48.0	10.206	-40.05	15 36.86	12.65	8.35	15 28 31.81
13	15 16 60.41	57.77	18 11 50.3	40.1	10.241	-39.26	15 28.05	12.87	8.47	15 32 28.36
14	15 21 6.62	3.99	18 27 22.9	13.0	10.276	-38.45	15 18.41	13.08	8.59	15 36 24.92
15	15 25 13.67	11.06	18 42 35.9	26.4	10.311	-37.63	15 7.92	13.29	8.71	15 40 21.47
16	15 29 21.56	18.97	18 57 29.1	19.9	10.346	-36.79	14 56.60	13.50	8.82	15 44 18.03
17	15 33 30.28	27.72	19 11 62.0	53.1	10.381	-35.94	14 44.44	13.70	8.94	15 48 14.59
18	15 37 39.84	37.32	19 26 14.2	5.6	10.415	-35.07	14 31.43	13.89	9.05	15 52 11.14
19	15 41 50.24	47.76	19 39 65.5	57.3	10.450	-34.19	14 17.60	14.08	9.16	15 56 7.70
20	15 45 61.46	59.02	19 53 35.4	27.5	10.484	-33.29	14 2.95	14.27	9.27	16 0 4.26
21	15 50 13.50	11.09	20 6 43.5	36.0	10.518	-32.38	13 47.47	14.45	9.38	16 4 0.82
22	15 54 26.36	23.98	20 19 29.7	22.6	10.552	-31.46	13 31.17	14.63	9.49	16 7 57.37
23	15 58 40.02	37.68	20 31 53.4	46.6	10.585	-30.52	13 14.07	14.81	9.60	16 11 53.93
24	16 2 54.47	52.18	20 43 54.3	47.7	10.618	-29.56	12 56.18	14.98	9.70	16 15 50.49
25	16 7 9.69	7.45	20 55 32.1	26.0	10.650	-28.59	12 37.52	15.15	9.80	16 19 47.04
26	16 11 25.67	23.48	21 6 46.5	40.8	10.682	-27.60	12 18.10	15.31	9.90	16 23 43.60
27	16 15 42.39	40.26	21 17 37.1	31.8	10.712	-26.61	11 57.94	15.47	10.00	16 27 40.16
28	16 19 59.83	57.76	21 27 63.6	58.6	10.741	-25.60	11 37.06	15.63	10.10	16 31 36.72
29	16 24 17.97	15.95	21 38 5.7	1.0	10.769	-24.57	11 15.47	15.89	10.19	16 35 33.27
30	16 28 36.77	34.81	21 47 42.9	39.6	10.797	-23.53	10 53.23	15.94	10.28	16 39 29.83
Dec. 1	16 32 56.22	54.33	21 56 55.1	51.1	10.823	-22.48	10 30.34	16.09	10.37	16 34 26.39
2	16 37 16.29	14.47	22 5 41.8	38.1	10.848	-21.41	10 6.83	16.24	10.45	16 47 22.95
3	16 41 36.96	35.21	22 13 62.9	59.5	10.872	-20.34	9 42.71	16.38	10.53	16 51 19.51
4	16 45 58.19	56.51	22 21 58.0	55.0	10.896	-19.25	9 18.03	16.52	10.60	16 55 16.06
5	16 50 19.96	18.35	22 29 27.0	24.3	10.918	-18.15	8 52.82	16.66	10.68	16 59 12.62
6	16 54 42.24	40.70	22 36 29.5	27.0	10.939	-17.05	8 27.10	16.79	10.75	17 3 9.18
7	16 59 5.00	3.54	22 43 5.5	3.3	10.958	-15.94	8 0.89	16.92	10.82	17 7 5.74
8	17 3 28.21	26.83	22 49 14.6	12.6	10.976	-14.82	7 34.23	17.04	10.88	17 11 2.30
9	17 7 51.84	50.54	22 54 56.7	55.0	10.993	-13.69	7 7.15	17.16	10.94	17 14 58.85
10	17 12 15.87	14.65	23 0 11.5	10.0	11.009	-12.55	6 39.67	17.28	10.99	17 18 55.41
11	17 16 40.27	39.13	23 4 59.0	57.8	11.023	-11.41	6 11.82	17.39	11.04	17 22 51.97
12	17 21 5.00	3.94	23 9 19.0	18.0	11.037	-10.26	5 43.65	17.49	11.09	17 26 48.53
13	17 25 30.04	29.07	23 13 11.4	10.6	11.049	-9.10	5 15.16	17.59	11.13	17 30 45.09
14	17 29 55.37	54.49	23 16 36.0	35.4	11.061	-7.94	4 46.37	17.68	11.17	17 34 41.63
15	17 34 20.96	20.17	23 19 32.7	32.2	11.071	-6.78	4 17.33	17.76	11.20	17 38 38.20
16	17 38 46.78	46.08	23 22 1.4	1.0	11.080	-5.61	3 48.06	17.84	11.23	17 42 34.76
17	17 43 12.79	12.18	23 24 2.1	1.8	11.087	-4.44	3 18.59	17.91	11.25	17 46 31.31
18	17 47 38.98	38.46	23 25 34.7	34.6	11.094	-3.27	2 48.96	17.98	11.27	17 50 27.88
19	17 52 5.30	4.87	23 26 39.2	39.1	11.099	-2.10	2 19.19	18.04	11.28	17 54 24.44
20	17 56 31.73	31.39	23 27 15.4	15.4	11.103	-0.92	1 49.31	18.09	11.29	17 58 21.00
21	18 0 58.24	58.00	23 27 23.3	23.3	11.106	+0.25	1 19.35	18.14	11.30	18 2 17.56
22	18 5 24.78	24.63	23 27 3.0	3.0	11.108	+1.43	0 49.36	18.18	11.30	18 6 14.12
23	18 9 51.33	51.27	23 26 14.5	14.5	11.107	+2.61	0 19.35	18.22	11.30	18 10 10.67
24	18 14 17.86	17.90	23 24 57.7	57.7	11.105	+3.79	0 10.63	18.25	11.29	18 14 7.23
25	18 18 44.33	44.46	23 23 12.7	12.7	11.102	+4.97	0 40.55	18.28	11.28	18 18 3.79
26	18 23 10.70	10.92	23 20 59.5	59.4	11.096	+6.14	1 10.37	18.31	11.26	18 22 0.35
27	18 27 36.94	37.25	23 18 18.1	17.9	11.090	+7.31	1 40.06	18.33	11.24	18 25 56.91
28	18 32 3.00	3.40	23 15 8.5	8.2	11.082	+8.48	2 9.57	18.35	11.21	18 29 53.47
29	18 36 28.85	29.34	23 11 30.9	30.5	11.072	+9.65	2 38.88	18.36	11.18	18 33 50.02
30	18 40 54.45	55.03	23 7 25.5	24.9	11.061	+10.81	3 7.93	18.37	11.14	18 37 46.58
31	18 45 19.77	20.43	23 2 52.3	51.6	11.049	+11.96	3 36.70	18.37	11.10	18 41 43.14
32	18 49 44.77	45.52	22 57 51.4	50.6	11.035	+13.11	+4 5.15	18.37	11.05	18 45 39.70

NOTE.—For Mean interval of Semidiameter passing the Meridian, subtract 0s.19 from the Sidereal Interval.

# 332 MOON-CULMINATIONS, 1872.

WASHINGTON MERIDIAN.												
Date.	Mean Time of Meridian Transit.	Diff. for 1h. of Long.	Sidereal Time of Semid. passing Merid.	Stars.	Bright Limb.	Date.	Mean Time of Meridian Transit.	Diff. for 1h. of Long.	Sidereal Time of Semid. passing Merid.	Stars.	Bright Limb.	
1872.	<sup>h</sup> <sup>m</sup>	<sup>m</sup>	<sup>s</sup>			1872.	<sup>h</sup> <sup>m</sup>	<sup>m</sup>	<sup>s</sup>			
Jan. 1	16 59.41	1.834	63.74	81 .. 84	II.	Mar. 1	17 41.52	2.326	71.49	119 .. 122	II.	
2	17 43.61	1.854	64.13	88 .. 91	II.	2	18 39.23	2.478	73.71	127 .. 133	II.	
3	18 29.91	1.927	65.28	97 .. 100	II.	3	19 40.03	2.574	75.08	134 .. 137	II.	
4	19 16.58	2.054	67.24	105 .. 108	II.	4	20 42.13	2.581	75.14	142 .. 145	II.	
5	20 7.88	2.230	69.90	109 .. 112	II.	5	21 43.32	2.502	73.94		II.	
6	21 3.83	2.446	72.02		II.	6	22 41.77	2.363	71.77		II.	
7	22 4.74	2.631	75.66		II.	7	23 36.62	2.211	69.42		II.	
8	23 9.52	2.751	77.26		II.	9	0 28.03	2.079	67.41		I.	
10	0 15.62	2.738	77.06		I.	10	1 16.63	1.984	65.98		I.	
11	1 19.83	2.598	75.16		I.	11	2 3.57	1.931	65.19		I.	
12	2 19.82	2.397	72.28		I.	12	2 49.66	1.917	65.03	10 .. 13	I.	
13	3 14.81	2.191	69.25	163 .. 166	I.	13	3 35.82	1.935	65.41	16 .. 19	I.	
14	4 5.24	2.021	66.74	169 .. 172	I.	14	4 22.69	1.973	66.11	21 .. 24	I.	
15	4 52.20	1.902	64.87	3 .. 6	I.	15	5 10.61	2.021	66.87	27 .. 30	I.	
16	5 36.94	1.828	63.81	6 .. 9	I.	16	5 59.64	2.062	67.47	32 .. 35	I.	
17	6 20.74	1.810	63.54	10 .. 13	I.	17	6 49.43	2.082	67.84	37 .. 40	I.	
18	7 4.60	1.841	63.86	15 .. 18	I.	18	7 39.38	2.074	67.70	44 .. 47	I.	
19	7 49.35	1.892	64.65	20 .. 23	I.	19	8 28.81	2.041	67.11	53 .. 56	I.	
20	8 35.54	1.958	65.68	26 .. 29	I.	20	9 17.22	1.991	66.23	61 .. 64	I.	
21	9 23.34	2.023	66.61	31 .. 34	I.	21	10 4.35	1.936	65.29	68 .. 71	I.	
22	10 12.52	2.069	67.26	35 .. 38	I.	22	10 50.25	1.899	64.56	75 .. 78	I.	
23	11 2.40	2.081	67.38	41 .. 44	I.	23	11 35.40	1.874	64.20	83 .. 86	I.	
24	11 52.12	2.056	66.96	50 .. 53	I.	24	12 20.45	1.889	64.40	86 .. 89	I.	
25	12 40.85	2.001	66.11	60 .. 63	II.	25	13 6.25	1.937	65.23	97 .. 100	II.	
26	13 28.06	1.934	65.07	67 .. 70	II.	26	13 53.74	2.028	66.72	105 .. 108	II.	
27	14 13.74	1.874	64.14	73 .. 76	II.	27	14 43.86	2.154	68.75	109 .. 112	II.	
28	14 58.16	1.833	63.55	82 .. 85	II.	28	15 37.31	2.302	71.05	115 .. 118	II.	
29	15 42.00	1.827	63.52	85 .. 88	II.	29	16 34.26	2.440	73.16	124 .. 127	II.	
30	16 26.20	1.863	64.16	95 .. 98	II.	30	17 34.07	2.534	74.53	130 .. 133	II.	
31	17 11.81	1.947	65.56	103 .. 106	II.	31	18 35.25	2.544	74.68	139 .. 142	II.	
Feb. 1	18 0.03	2.080	67.71	108 .. 111	II.	Apr. 1	19 35.50	2.464	73.60	148 .. 151	II.	
2	18 51.98	2.256	70.36	112 .. 115	II.	2	20 33.15	2.339	71.67	154 .. 157	II.	
3	19 48.42	2.448	73.18	122 .. 125	II.	3	21 27.66	2.200	69.46	160 .. 163	II.	
4	20 49.25	2.611	75.48	129 .. 132	II.	4	22 18.85	2.073	67.46		II.	
5	21 53.09	2.655	76.49		II.	5	23 7.43	1.982	65.97		II.	
6	22 57.38	2.648	75.87		II.	6	23 54.29	1.930	65.14		II.	
7	23 59.46	2.511	73.95		II.	8	0 40.39	1.917	64.95		I.	
9	0 57.56	2.329	71.22		I.	9	1 26.57	1.937	65.29		I.	
10	1 51.30	2.154	69.62		I.	10	2 13.53	1.979	66.03		I.	
11	2 41.23	2.015	66.52		I.	11	3 1.62	2.029	66.90	25 .. 28	I.	
12	3 28.39	1.924	65.14	4 .. 7	I.	12	3 50.87	2.073	67.67	30 .. 3	I.	
13	4 13.94	1.879	64.48	9 .. 12	I.	13	4 40.94	2.095	68.08	35 .. 3	I.	
14	4 58.92	1.876	64.48	12 .. 15	I.	14	5 31.23	2.089	67.99	40 .. 4	I.	
15	5 44.24	1.905	64.98	18 .. 21	I.	15	6 20.94	2.053	67.45	48 .. 5	I.	
16	6 30.54	1.956	65.79	24 .. 27	I.	16	7 9.54	1.997	66.56	59 .. 6	I.	
17	7 18.16	2.012	66.65	30 .. 33	I.	17	7 56.77	1.939	65.58	66 .. 6	I.	
18	8 7.04	2.058	67.30	34 .. 37	I.	18	8 42.70	1.891	64.77	72 .. 7	I.	
19	8 56.76	2.080	67.59	39 .. 42	I.	19	9 27.74	1.863	64.32	81 .. 84	I.	
20	9 46.62	2.069	67.35	45 .. 48	I.	20	10 12.61	1.878	64.41	85 .. 8	I.	
21	10 35.86	2.029	66.65	58 .. 61	I.	21	10 58.18	1.927	65.16	94 .. 97	I.	
22	11 23.88	1.972	65.71	64 .. 67	I.	22	11 45.45	2.029	66.61	102 .. 19	II.	
23	12 10.48	1.913	64.74	70 .. 73	II.	23	12 35.43	2.152	68.68	108 .. 111	II.	
24	12 55.80	1.868	64.02	79 .. 82	II.	24	13 28.94	2.310	71.12	112 .. 11	II.	
25	13 40.33	1.849	63.74	84 .. 87	II.	25	14 26.28	2.465	73.45	122 .. 12	II.	
26	14 24.82	1.868	64.07	92 .. 95	II.	26	15 26.88	2.570	75.06	129 .. 135	II.	
27	15 10.21	1.923	65.07	101 .. 104	II.	27	16 29.00	2.591	75.38	136 .. 139	II.	
28	15 57.48	2.024	66.75	107 .. 110	II.	28	17 30.42	2.512	74.31	145 .. 148	II.	
29	16 47.67	2.164	68.97	110 .. 113	II.	29	18 29.08	2.371	72.24	153 .. 156	II.	
30	17 41.52	2.326	71.49	119 .. 122	II.	30	19 24.04	2.214	69.81	157 .. 163	II.	
31	18 39.23	2.478	73.71	127 .. 130	II.	31	20 15.25	2.065	67.53	165 .. 169	II.	

# MOON-CULMINATIONS, 1872. 333

## WASHINGTON MERIDIAN.

Date.	Mean Time of Meridian Transit.	Diff. for 1h. of Long.	Sidereal Time of Semid. passing Merid.	Stars.	Bright Limb.	Date.	Mean Time of Meridian Transit.	Diff. for 1h. of Long.	Sidereal Time of Semid. passing Merid.	Stars.	Bright Limb.
1872.	h m	m	s			1872.	h m	m	s		
May 1	20 15.25	2.065	67.53	165 .. 168	II.	July 1	21 34.22	1.994	66.35	24 .. 27	II.
2	21 3.46	1.960	65.80	172 .. 1	II.	2	22 22.86	2.056	67.26		II.
3	21 49.66	1.898	64.75		II.	3	23 12.74	2.095	67.83		II.
4	22 34.92	1.881	64.42		II.	5	0 3.12	2.095	67.80		II.
5	23 20.23	1.900	64.71		II.	6	0 52.99	2.054	67.17		I.
7	0 6.36	1.948	65.46		I.	7	1 41.46	1.981	66.07		I.
8	0 53.83	2.009	66.45		I.	8	2 28.02	1.898	64.78		I.
9	1 42.74	2.066	67.40		I.	9	3 12.66	1.826	63.62	70 .. 73	I.
10	2 32.81	2.101	68.03	34 .. 37	I.	10	3 55.77	1.774	62.84	79 .. 82	I.
11	3 23.34	2.103	68.12	39 .. 42	I.	11	4 38.04	1.756	62.61	84 .. 87	I.
12	4 13.51	2.073	67.68	45 .. 48	I.	12	5 20.41	1.784	63.11	91 .. 94	I.
13	5 2.51	2.010	66.78	55 .. 58	I.	13	6 4.07	1.862	64.39	99 .. 102	I.
14	5 49.92	1.941	65.69	62 .. 65	I.	14	6 50.21	1.993	66.52	105 .. 108	I.
15	6 35.73	1.879	64.68	69 .. 72	I.	15	7 40.15	2.178	69.37	110 .. 113	I.
16	7 20.29	1.839	64.02	78 .. 81	I.	16	8 35.01	2.398	72.61	117 .. 120	I.
17	8 4.29	1.834	63.90	83 .. 86	I.	17	9 35.16	2.608	75.60	126 .. 129	I.
18	8 48.66	1.871	64.45	89 .. 92	I.	18	10 39.69	2.742	77.47	133 .. 136	I.
19	9 34.49	1.956	65.76	97 .. 100	I.	19	11 45.81	2.748	77.50	143 .. 146	I.
20	10 22.95	2.090	67.82	105 .. 108	I.	20	12 50.53	2.626	75.78	151 .. 154	II.
21	11 15.10	2.265	70.46	109 .. 112	I.	21	13 51.29	2.432	73.01	157 .. 160	II.
22	12 11.75	2.456	73.29	117 .. 120	II.	22	14 47.22	2.234	70.12	164 .. 167	II.
23	13 12.73	2.615	75.61	126 .. 129	II.	23	15 38.78	2.077	67.69	171 .. 174	II.
24	14 16.59	2.685	76.69	131 .. 136	II.	24	16 27.06	1.962	66.00	3 .. 6	II.
25	15 20.73	2.636	76.04	143 .. 146	II.	25	17 13.38	1.907	65.14	7 .. 10	II.
26	16 22.41	2.490	73.99	150 .. 153	II.	26	17 58.98	1.899	65.02	11 .. 14	II.
27	17 19.92	2.301	71.23	156 .. 159	II.	27	18 44.82	1.927	65.48	16 .. 19	II.
28	18 12.93	2.122	68.52	163 .. 166	II.	28	19 31.67	1.980	66.28	23 .. 26	II.
29	19 2.08	1.983	66.32	169 .. 172	II.	29	20 19.90	2.036	67.12	28 .. 31	II.
30	19 48.48	1.893	64.83	1 .. 4	II.	30	21 9.32	2.081	67.74	33 .. 36	II.
31	20 33.35	1.854	64.14	6 .. 9	II.	31	21 59.54	2.095	67.89		II.
June 1	21 17.83	1.859	64.17	10 .. 13	II.	Aug. 1	22 49.57	2.068	67.43		II.
2	22 2.88	1.900	64.78		II.	2	23 38.55	2.008	66.46		II.
3	22 49.22	1.964	65.75		II.	4	0 25.82	1.930	65.20		I.
4	23 37.19	2.032	66.82		II.	5	1 11.16	1.850	63.92		I.
6	0 26.66	2.086	67.67		I.	6	1 54.76	1.787	62.93		I.
7	1 17.08	2.107	68.04		I.	7	2 37.14	1.751	62.39	83 .. 86	I.
8	2 7.59	2.088	67.80		I.	8	3 19.12	1.753	62.49	86 .. 89	I.
9	2 57.01	2.032	66.96	51 .. 54	I.	9	4 1.63	1.798	63.31	96 .. 99	I.
10	3 44.89	1.956	65.82	60 .. 63	I.	10	4 45.83	1.894	64.92	103 .. 106	I.
11	4 30.89	1.879	64.63	67 .. 70	I.	11	5 32.92	2.039	67.27	109 .. 112	I.
12	5 15.22	1.819	63.70	73 .. 76	I.	12	6 24.02	2.228	70.19	113 .. 116	I.
13	5 58.45	1.790	63.22	82 .. 85	I.	13	7 19.98	2.434	73.23	123 .. 126	I.
14	6 41.45	1.801	63.41	85 .. 88	I.	14	8 20.60	2.609	75.74	129 .. 132	I.
15	7 25.29	1.860	64.36	94 .. 97	I.	15	9 24.55	2.698	76.93	137 .. 140	I.
16	8 11.16	1.980	66.14	103 .. 106	I.	16	10 29.18	2.666	76.42	147 .. 150	I.
17	9 0.41	2.140	68.68	108 .. 111	I.	17	11 31.75	2.536	74.50	154 .. 157	I.
18	9 54.17	2.347	71.77	112 .. 115	I.	18	12 30.54	2.361	71.95	160 .. 163	II.
19	10 53.07	2.559	74.83	122 .. 125	I.	19	13 25.12	2.194	69.47	167 .. 170	II.
20	11 56.56	2.717	77.03	129 .. 132	I.	20	14 16.16	2.067	67.55	174 .. 3	II.
21	13 2.49	2.752	77.56	138 .. 141	II.	21	15 4.73	1.989	66.39	5 .. 8	II.
22	14 7.66	2.655	76.24	147 .. 150	II.	22	15 52.01	1.958	65.96	10 .. 13	II.
23	15 9.26	2.469	73.62	154 .. 157	II.	23	16 39.04	1.967	66.14	14 .. 17	II.
24	16 5.99	2.261	70.59	160 .. 163	II.	24	17 26.61	2.001	66.72	19 .. 22	II.
25	16 57.99	2.081	67.88	167 .. 170	II.	25	18 15.18	2.047	67.46	26 .. 29	II.
26	17 46.28	1.946	65.86	173 .. 2	II.	26	19 4.81	2.086	68.04	31 .. 34	II.
27	18 32.13	1.879	64.67	5 .. 8	II.	27	19 55.12	2.100	68.22	36 .. 39	II.
28	19 16.87	1.857	64.27	9 .. 12	II.	28	20 45.38	2.082	67.86	41 .. 44	II.
29	20 1.58	1.877	64.50	12 .. 15	II.	29	21 34.80	2.031	66.99	51 .. 54	II.
30	20 47.18	1.928	65.32	18 .. 21	II.	30	22 22.71	1.959	65.78		II.
31	21 34.22	1.994	66.35	24 .. 27	II.	31	23 8.80	1.882	64.49		II.

# 334 MOON-CULMINATIONS, 1872.

WASHINGTON MERIDIAN.										
Date.	Mean Time of Meridian Transit.	Diff. for 1h. of Long.	Sidereal Time of Semid. passing Merid.	Stars.	Bright Limb.	Date.	Mean Time of Meridian Transit.	Diff. for 1h. of Long.	Sidereal Time of Semid. passing Merid.	Bright Limb.
1872.						1872.				
Sept. 1	h m	m	s			Nov. 1	h m	m	s	
3	23 53.14	1.816	63.37		II.	2	0 10.00	2.089	67.89	I.
4	0 36.14	1.772	62.66		I.	3	1 2.11	2.258	70.52	I.
5	1 18.45	1.760	62.50		I.	4	1 58.33	2.424	73.06	I.
6	2 0.94	1.788	63.01		I.	5	2 58.06	2.540	74.84	I.
7	2 44.59	1.820	64.24	102 .. 105	I.	6	3 59.61	2.569	75.33	I.
8	3 30.44	1.972	66.15	167 .. 110	I.	7	5 0.69	2.504	74.43	I.
9	4 19.54	2.126	68.64	111 .. 114	I.	8	5 59.31	2.373	72.52	I.
10	5 12.67	2.304	71.43	120 .. 123	I.	9	6 54.41	2.221	70.21	I.
11	6 10.05	2.472	73.88	127 .. 130	I.	10	7 46.07	2.090	68.14	I.
12	7 10.87	2.582	75.46	133 .. 137	I.	11	8 35.03	1.999	66.64	I.
13	8 13.29	2.631	75.67	143 .. 146	I.	12	9 22.37	1.955	65.89	I.
14	9 14.99	2.526	74.53	151 .. 154	I.	13	10 9.22	1.957	65.85	I.
15	10 14.07	2.393	72.51	156 .. 159	I.	14	10 56.61	1.997	66.47	I.
16	11 9.74	2.253	70.31	164 .. 167	I.	15	11 45.27	2.061	67.46	II.
17	12 2.16	2.127	68.41	170 .. 173	II.	16	12 35.56	2.127	68.54	II.
18	12 52.16	2.046	67.21	3 .. 6	II.	17	13 27.33	2.177	69.33	II.
19	13 40.74	2.009	66.67	8 .. 11	II.	18	14 19.77	2.185	69.54	II.
20	14 28.99	2.010	66.75	11 .. 14	II.	19	15 11.87	2.147	69.01	II.
21	15 17.44	2.038	67.27	18 .. 21	II.	20	16 2.54	2.069	67.87	II.
22	16 6.84	2.079	67.98	23 .. 26	II.	21	16 51.03	1.970	66.35	II.
23	16 57.20	2.115	68.57	29 .. 32	II.	22	17 37.13	1.874	64.81	II.
24	17 48.17	2.127	68.89	34 .. 37	II.	23	18 21.12	1.797	63.54	II.
25	18 39.08	2.109	68.49	39 .. 42	II.	24	19 3.66	1.753	62.79	II.
26	19 29.16	2.058	67.67	47 .. 50	II.	25	19 45.58	1.748	62.68	II.
27	20 17.71	1.986	66.46	58 .. 61	II.	26	20 27.94	1.790	63.31	II.
28	21 4.45	1.909	65.13	64 .. 67	II.	27	21 11.92	1.883	64.77	II.
29	21 49.39	1.840	63.95	70 .. 73	II.	28	21 58.71	2.025	66.99	II.
30	22 32.92	1.793	63.12		II.	29	22 49.44	2.210	69.81	II.
Oct. 1	23 15.69	1.777	62.82		II.	30	23 44.87	2.410	72.81	II.
2	23 58.49	1.797	63.14		II.	Dec. 1	0 44.87	2.580	75.29	I.
3	0 42.26	1.858	64.16		I.	2	1 48.01	2.662	76.49	I.
4	1 27.97	1.960	65.85		I.	3	2 51.65	2.620	75.99	I.
5	2 16.60	2.100	68.11		I.	4	3 53.04	2.483	74.07	I.
6	3 8.90	2.263	70.66	116 .. 119	I.	5	4 50.48	2.303	71.45	I.
7	4 5.01	2.412	73.02	125 .. 128	I.	6	5 43.64	2.134	68.89	I.
8	5 4.33	2.518	74.61	131 .. 134	I.	7	6 33.20	2.006	66.89	I.
9	6 5.25	2.542	74.98	141 .. 144	I.	8	7 20.36	1.933	65.67	I.
10	7 5.70	2.481	74.65	148 .. 151	I.	9	8 6.39	1.910	65.27	I.
11	8 3.90	2.363	72.27	154 .. 157	I.	10	8 52.41	1.934	65.61	I.
12	8 58.99	2.230	70.19	161 .. 164	I.	11	9 39.51	1.995	66.49	I.
13	9 51.07	2.116	68.37	167 .. 170	I.	12	10 28.29	2.071	67.65	I.
14	10 40.83	2.038	67.11	1 .. 4	I.	13	11 18.88	2.141	68.72	I.
15	11 29.24	2.004	66.55	5 .. 8	I.	14	12 10.85	2.181	69.31	II.
16	12 17.32	2.009	66.65	10 .. 13	II.	15	13 3.21	2.172	69.19	II.
17	13 5.91	2.045	67.25	14 .. 17	II.	16	13 54.71	2.111	68.32	II.
18	13 55.59	2.096	68.11	20 .. 23	II.	17	14 44.29	2.016	66.90	II.
19	14 46.48	2.143	68.91	27 .. 30	II.	18	15 31.39	1.909	65.24	II.
20	15 38.25	2.165	69.32	32 .. 35	II.	19	16 15.99	1.812	63.72	II.
21	16 30.14	2.151	69.18	37 .. 40	II.	20	16 58.59	1.743	62.61	II.
22	17 21.23	2.100	68.42	45 .. 48	II.	21	17 39.95	1.711	62.09	II.
23	18 10.72	2.021	67.18	53 .. 56	II.	22	18 21.07	1.724	62.31	II.
24	18 58.18	1.934	65.76	61 .. 64	II.	23	19 3.09	1.787	63.36	II.
25	19 43.60	1.855	64.43	68 .. 71	II.	24	19 47.28	1.905	65.25	II.
26	20 27.37	1.798	63.42	75 .. 78	II.	25	20 34.94	2.077	67.93	II.
27	21 10.14	1.773	62.95	82 .. 85	II.	26	21 27.29	2.292	71.17	II.
28	21 52.78	1.788	63.12		II.	27	22 24.98	2.514	74.38	II.
29	22 36.27	1.844	64.03		II.	28	23 27.53	2.682	76.77	II.
30	23 21.65	1.946	65.66		II.	29	0 32.82	2.735	77.41	I.
Nov. 1	0 10.00	2.089	67.89		I.	30	1 37.70	2.646	76.33	I.
2	1 2.11	2.258	70.52		I.	31	2 37.39	2.475	73.88	I.

# MOON-CULMINATING STARS. 335

## MEAN PLACES FOR 1872.0.

No.	Name.	Magni- tude.	Right Ascension.	Annual Variation.	Declination.	Annual Variation.
1	<i>d</i> Piscium . . .	6.5	<sup>h</sup> 0 <sup>m</sup> 14 <sup>s</sup> 0.78	+3.086	+ 7 28 46.1	+20.06
2	44 Piscium . . .	6	0 18 50.55	3.075	+ 1 13 51.6	19.99
3	10 Ceti . . .	6	0 20 3.52	3.077	— 0 45 32.0	19.98
4	<i>δ</i> Piscium . . .	4.5	0 42 2.56	3.108	+ 6 53 17.6	19.71
5	<i>ε</i> PISCIMUM . . .	4	0 56 18.10	3.110	7 12 2.0	19.48
6	<i>ζ</i> <sup>1</sup> Piscium . . .	5.4	1 7 2.70	+3.131	+ 6 53 52.5	+19.14
7	<i>μ</i> Piscium . . .	5	1 23 28.76	3.139	5 28 55.4	18.56
8	<i>η</i> PISCIMUM . . .	4.3	1 24 38.12	3.200	14 41 7.6	18.72
9	<i>ν</i> Piscium . . .	5.4	1 34 46.28	3.119	4 50 18.6	18.34
10	<i>ο</i> PISCIMUM . . .	4	1 38 38.23	3.162	8 30 45.6	18.26
11	<i>ξ</i> <sup>1</sup> Ceti . . .	4.5	2 6 13.00	+3.169	+ 8 14 42.5	+17.08
12	<i>ξ</i> <sup>2</sup> Ceti . . .	4	2 21 21.37	3.184	7 53 6.6	16.36
13	<i>μ</i> Ceti . . .	4	2 38 1.50	3.234	9 34 19.5	15.42
14	<i>π</i> Arietis . . .	6.5	2 42 9.13	3.338	16 55 51.6	15.28
15	<i>ε</i> Arietis . . .	4.5	2 51 53.82	3.422	20 49 36.8	14.68
16	<i>λ</i> Ceti . . .	6.5	2 52 51.74	+3.215	+ 8 23 47.3	+14.63
17	<i>δ</i> Arietis . . .	4.5	3 4 18.79	3.421	19 14 27.3	13.92
18	<i>ζ</i> ARIETIS . . .	4.5	3 7 32.83	3.437	20 34 7.2	13.65
19	<i>f</i> Tauri . . .	4	3 23 48.63	3.306	12 29 45.4	12.64
20	<i>η</i> TAURI . . .	3	3 39 52.70	3.554	23 42 26.6	11.46
21	<i>ε</i> Tauri . . .	5	3 41 15.15	+3.281	+10 44 50.2	+11.36
22	<i>λ</i> Tauri . . .	3.4	3 53 35.44	3.317	12 7 36.6	10.52
23	<i>A</i> <sup>1</sup> Tauri . . .	5.4	3 57 7.80	3.537	21 43 47.7	10.18
24	<i>γ</i> TAURI . . .	4	4 12 30.65	3.407	15 18 59.9	9.06
25	<i>ο</i> <sup>1</sup> Tauri . . .	5.4	4 18 39.05	3.582	22 31 16.5	8.56
26	<i>ε</i> TAURI . . .	4.3	4 21 8.65	+3.495	+18 53 40.6	+ 8.38
27	<i>α</i> TAURI . . .	1	4 28 34.66	3.436	16 15 0.1	7.62
28	<i>τ</i> Tauri . . .	4.5	4 34 33.89	3.594	22 42 33.5	7.30
29	<i>ι</i> Tauri . . .	5	4 55 26.82	3.583	21 24 17.2	5.54
30	11 ORIONIS . . .	5	4 57 15.42	3.425	15 13 25.6	5.41
31	<i>ο</i> Tauri . . .	6	5 19 56.87	+3.603	+21 49 31.2	+ 3.52
32	119 Tauri . . .	6.5	5 24 42.67	3.517	18 29 48.0	3.09
33	<i>ζ</i> Tauri . . .	3.4	5 29 59.84	3.586	21 3 44.0	2.60
34	<i>χ</i> <sup>1</sup> Orionis . . .	5.4	5 46 48.18	3.552	20 14 59.8	+ 1.06
35	<i>ν</i> Orionis . . .	5.4	6 0 15.91	3.428	14 46 52.7	— 0.05
36	<i>η</i> Geminorum . . .	3.4	6 7 9.09	+3.624	+22 32 29.1	— 0.64
37	<i>μ</i> GEMINORUM . . .	3	6 15 13.03	3.633	22 34 37.1	1.44
38	<i>γ</i> GEMINORUM . . .	2.3	6 30 19.05	3.469	16 30 23.1	2.67
39	<i>ξ</i> Geminorum . . .	4.3	6 38 6.45	3.373	13 1 52.5	3.49
40	<i>ζ</i> Geminorum . . .	4	6 56 31.03	3.566	20 45 21.0	4.91
41	<i>λ</i> Geminorum . . .	4.3	7 10 44.28	+3.456	+16 46 9.4	— 6.10
42	<i>δ</i> GEMINORUM . . .	3.4	7 12 28.66	3.591	22 12 57.3	6.23
43	63 Geminorum . . .	6.5	7 20 8.51	3.570	21 42 18.6	6.95
44	6 Canis Minoris . . .	6.5	7 22 40.44	+3.346	+12 16 11.2	— 7.08

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## MEAN PLACES FOR 1872.0.

No.	Name.	Magni- tude.	Right Ascension.	Annual Variation.	Declination.	Annual Variation.
45	68 Geminorum .	6.5	<sup>h</sup> 7 <sup>m</sup> 26 <sup>s</sup> 18.16	+3.431	+16° 6' 0.8	— 7.33
46	f Geminorum .	6	7 32 5.09	3.475	17 57 49.3	7.83
47	1 Cancri . . .	6	7 49 43.45	3.418	16 7 48.9	9.24
48	5 Cancri . . .	6	7 54 12.49	3.428	16 48 23.0	9.55
49	8 Cancri . . .	6	7 57 56.67	3.351	13 28 51.9	9.92
50	μ <sup>2</sup> Cancri . . .	5	8 0 13.85	+3.542	+21 57 11.7	—10.07
51	12 Cancri . . .	6	8 1 33.17	3.361	14 0 40.7	10.19
52	ζ <sup>1</sup> Cancri . . .	5.4	8 4 52.23	3.452	18 1 55.0	10.50
53	d <sup>1</sup> Cancri . . .	6	8 16 2.01	3.447	18 44 29.1	11.22
54	29 Cancri . . .	6	8 21 28.80	3.358	14 37 56.3	11.68
55	θ Cancri . . .	6	8 24 17.77	+3.432	+18 31 31.3	—11.86
56	c <sup>1</sup> Cancri . . .	6	8 30 9.08	3.257	10 5 59.1	12.22
57	39 Cancri . . .	6	8 32 44.40	3.460	20 27 27.8	12.42
58	δ Cancri . . .	4	8 37 24.57	3.422	18 37 22.9	12.96
59	A <sup>2</sup> Cancri . . .	6	8 39 54.95	3.296	12 34 40.3	12.94
60	α Cancri . . .	4	8 51 29.14	+3.291	+12 21 6.1	—13.68
61	κ Cancri . . .	5	9 0 48.74	3.255	11 10 55.4	14.21
62	π <sup>2</sup> Cancri . . .	6	9 8 9.75	3.322	15 28 17.5	14.65
63	ω Leonis . . .	6	9 21 36.18	3.221	9 36 44.3	15.50
64	h Leonis . . .	6	9 25 5.86	3.226	10 16 42.9	15.70
65	10 Leonis . . .	5.6	9 30 27.26	+3.174	+ 7 24 32.9	—15.91
66	o Leonis . . .	4.3	9 34 19.45	3.226	10 28 23.8	16.19
67	B. A. C. 3336 .	5.6	9 39 24.92	3.169	7 17 56.0	16.40
68	π Leonis . . .	5	9 53 26.99	3.180	8 39 25.9	17.10
69	α Leonis . . .	1.2	10 1 33.24	3.203	12 35 31.6	17.41
70	43 Leonis . . .	6	10 16 18.62	+3.144	+ 7 11 30.2	—18.13
71	45 Leonis . . .	6	10 20 53.22	3.177	10 24 49.2	18.22
72	ρ Leonis . . .	4	10 26 4.26	3.166	9 57 52.6	18.39
73	34 Sextantis .	6	10 36 0.85	3.104	4 15 2.9	18.74
74	l Leonis . . .	5	10 42 31.65	3.159	11 13 19.7	18.92
75	55 Leonis . . .	6	10 49 7.46	+3.092	+ 1 25 10.1	—19.10
76	d Leonis . . .	5	10 53 56.98	3.103	4 18 14.1	19.28
77	c Leonis . . .	5	10 54 6.75	3.117	6 47 18.2	19.27
78	χ Leonis . . .	5	10 58 24.86	3.101	8 1 37.2	19.42
79	ψ <sup>2</sup> Leonis . . .	5	11 7 12.90	3.085	+ 0 37 34.7	19.57
80	φ Leonis . . .	5.4	11 10 9.28	+3.053	— 2 57 9.1	—19.63
81	σ Leonis . . .	4	11 14 32.14	3.098	+ 6 43 49.1	19.68
82	79 Leonis . . .	6	11 17 28.28	3.084	+ 2 6 35.1	19.74
83	υ Leonis . . .	5.4	11 30 23.75	3.072	— 0 7 1.4	19.83
84	β Virginis . . .	3.4	11 44 1.71	3.127	+ 2 29 8.7	20.29
85	10 Virginis . . .	6	12 3 7.74	+3.074	+ 2 36 58.3	—20.28
86	η Virginis . . .	3.4	12 13 21.48	3.068	+ 0 2 41.7	20.03
87	γ Virginis . . .	6	12 27 10.49	3.092	— 8 44 44.0	19.89
88	f Virginis . . .	6	12 30 11.94	+3.086	— 5 7 39.4	—19.97

# MOON-CULMINATING STARS. 337

## MEAN PLACES FOR 1872.0.

No.	Name.	Magn- tude.	Right Ascension.	Annual Variation.	Declination.	Annual Variation.
89	$\chi$ Virginis . .	5	<sup>h</sup> 12 <sup>m</sup> 32 <sup>s</sup> 38.82	+3.095	<sup>°</sup> — 7 17 25.3	—19.90
90	$\gamma$ Virginis . .	3.2	12 35 10.59	3.040	0 44 50.3	19.84
91	28 Virginis . .	6	12 35 20.78	3.100	6 47 42.2	19.84
92	38 Virginis . .	6	12 46 38.10	3.073	2 51 25.8	19.67
93	$\psi$ Virginis . .	5	12 47 41.98	3.118	8 50 35.7	19.64
94	$k$ Virginis . .	6	12 53 4.11	+3.089	— 3 7 10.9	—19.49
95	48 Virginis . .	6	12 57 18.71	3.086	2 58 23.6	19.46
96	$\theta$ VIRGINIS . .	4.5	13 3 19.48	3.101	4 51 17.3	19.31
97	$\alpha$ VIRGINIS . .	1	13 18 27.14	3.153	10 29 31.9	18.91
98	$\rho$ Virginis . .	5	13 25 18.87	3.118	5 35 39.2	18.73
99	$\lambda$ Virginis . .	5	13 26 13.72	+3.153	— 9 30 17.1	—18.69
100	$m$ Virginis . .	6	13 34 53.75	3.143	8 3 23.9	18.35
101	83 Virginis . .	6	13 37 35.73	3.228	15 32 8.0	18.33
102	86 Virginis . .	6	13 39 7.25	3.188	11 47 3.3	18.21
103	89 Virginis . .	5	13 42 55.20	3.249	17 29 44.7	18.12
104	94 Virginis . .	6	13 59 31.27	+3.169	— 8 16 47.0	—17.37
105	$\kappa$ Virginis . .	4.5	14 6 4.32	3.197	9 40 40.6	17.09
106	$\lambda$ Virginis . .	5.4	14 12 11.25	3.240	12 46 50.9	16.78
107	2 Libræ . .	6	14 16 32.45	3.219	11 7 42.8	16.69
108	5 Libræ . .	6	14 38 54.48	3.300	14 55 8.6	15.45
109	$\alpha^2$ LIBRÆ . .	2.3	14 43 48.01	+3.307	—15 30 28.9	—15.20
110	$\gamma^1$ Libræ . .	5.4	15 4 55.80	3.410	19 18 19.5	12.89
111	$\zeta^1$ Libræ . .	4	15 21 2.53	3.377	16 16 6.7	12.86
112	$\gamma$ Libræ . .	4.5	15 28 22.08	3.347	14 21 38.4	12.31
113	$\theta$ Libræ . .	5.4	15 46 32.52	3.413	16 21 6.1	10.90
114	$\delta$ SCORPII . .	2.3	15 52 46.06	+3.536	—22 15 17.0	—10.57
115	$\beta^1$ SCORPII . .	2	15 57 59.79	3.477	19 27 10.3	10.20
116	$\nu^2$ Scorpii . .	4	16 4 33.58	3.481	19 7 32.1	9.65
117	$\sigma$ Scorpii . .	3.4	16 13 24.69	3.637	25 16 59.1	9.00
118	$\psi$ Ophiuchi . .	5	16 16 36.91	3.503	19 44 8.1	8.80
119	$\chi$ Ophiuchi . .	6	16 19 36.48	+3.470	—18 9 48.3	— 8.50
120	$\alpha$ SCORPII . .	1.2	16 21 33.75	3.669	26 8 43.4	8.38
121	$\omega$ Ophiuchi . .	5	16 24 33.14	3.548	21 11 26.1	8.04
122	B. A. C. 5579 .	5	16 34 10.33	3.463	17 29 30.7	7.31
123	20 Ophiuchi . .	5	16 42 45.27	3.313	10 33 15.2	6.71
124	29 Ophiuchi . .	6	16 54 22.04	+3.504	—18 41 37.5	— 5.65
125	$\eta$ Ophiuchi . .	2.3	17 3 2.33	3.436	15 33 49.5	4.81
126	$\nu$ Serpentis . .	5.4	17 13 37.73	3.372	12 42 50.9	4.00
127	$\theta$ Ophiuchi . .	3.4	17 14 9.04	3.681	24 52 9.4	4.03
128	$\xi$ Serpentis . .	4.3	17 30 15.49	3.434	15 18 55.2	2.64
129	$\circ$ Serpentis . .	5.4	17 34 13.28	+3.370	—12 48 15.7	— 2.27
130	4 Sagittarii . .	5	17 51 58.65	3.661	23 48 5.3	— 0.71
131	$\mu^1$ SAGITTARII .	4	18 6 6.51	+3.586	—21 5 22.6	+ 0.54



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MEAN PLACES FOR 1872.0.

No.	Name.	Magni- tude.	Right Ascension.	Annual Variation.	Declination.	Annual Variation.
132	21 Sagittarii . .	5	<sup>h</sup> 18 <sup>m</sup> 17 <sup>s</sup> 43.56	+3.574	—20° 36' 27.6	+ 1.53
133	λ Sagittarii . .	3	18 20 4.30	3.706	25 29 25.0	1.53
134	B. A. C. 6279 . .	5.4	18 21 54.17	3.419	14 38 43.3	1.90
135	24 Sagittarii . .	6	18 26 4.43	3.667	24 7 28.2	2.28
136	ν <sup>1</sup> Sagittarii . .	5	18 46 26.42	3.626	22 53 58.2	4.04
137	ξ <sup>2</sup> Sagittarii . .	4	18 50 5.46	+3.582	—21 16 20.5	+ 4.35
138	ο Sagittarii . .	4	18 57 0.61	3.598	21 55 34.1	4.91
139	π Sagittarii . .	3	19 2 8.96	3.573	21 13 27.5	5.38
140	d SAGITTARII . .	5	19 10 8.67	3.513	19 10 38.9	6.08
141	ρ <sup>1</sup> Sagittarii . .	4	19 14 14.92	3.487	18 5 8.1	6.45
142	υ Sagittarii . .	5.4	19 14 23.80	+3.444	—16 11 36.4	+ 6.35
143	ε <sup>2</sup> Sagittarii . .	5	19 35 11.76	3.438	16 25 16.0	8.13
144	f Sagittarii . .	5	19 38 53.64	3.506	20 3 58.0	8.36
145	g Sagittarii . .	6.5	19 50 41.43	3.409	15 49 44.4	9.27
146	63 Sagittarii . .	6	19 54 48.29	3.366	13 59 18.5	9.71
147	ξ <sup>2</sup> Capricorni . .	6	20 5 18.01	+3.350	—12 59 20.7	+10.27
148	α <sup>2</sup> CAPRICORNI . .	3.4	20 10 57.04	3.333	12 56 22.3	10.86
149	ρ Capricorni . .	5	20 21 33.38	3.430	18 14 4.3	11.64
150	τ <sup>2</sup> Capricorni . .	5	20 32 6.75	3.362	15 24 8.3	12.34
151	ε Aquarii . .	4.3	20 40 44.82	3.257	9 57 45.2	12.92
152	μ AQUARI . .	5.4	20 45 44.85	+3.240	— 9 27 41.9	+13.25
153	θ Capricorni . .	4	20 58 45.02	3.384	17 44 21.1	14.08
154	ν Aquarii . .	4.5	21 2 37.07	3.273	11 53 17.8	14.35
155	β AQUARI . .	3	21 24 49.16	3.164	6 7 57.6	15.64
156	ξ AQUARI . .	5.4	21 30 56.16	3.198	8 25 36.3	15.94
157	λ Capricorni . .	5.6	21 39 38.59	+3.237	—11 57 17.7	+16.43
158	θ AQUARI . .	4.5	22 10 4.68	3.170	8 25 10.4	17.78
159	ρ Aquarii . .	5.6	22 13 27.78	3.163	8 27 44.6	17.98
160	γ Aquarii . .	4.3	22 15 2.73	3.105	2 1 52.2	18.03
161	ζ Aquarii . .	3.4	22 22 14.38	3.091	0 40 25.7	18.31
162	σ Aquarii . .	5.4	22 23 52.23	+3.182	—11 19 52.9	+18.40
163	η AQUARI . .	4.3	22 28 46.69	3.084	0 46 34.8	18.44
164	κ Aquarii . .	5	22 31 7.57	3.112	4 53 14.5	18.48
165	78 Aquarii . .	6	22 47 54.30	3.128	— 7 52 58.3	19.09
166	β Piscium . .	5.4	22 57 21.92	3.057	+ 3 7 53.0	19.31
167	φ Aquarii . .	4.5	23 7 41.63	+3.113	— 6 44 18.3	+19.37
168	γ Piscium . .	4	23 10 31.77	3.110	+ 2 35 0.6	19.63
169	κ Piscium . .	5.4	23 20 22.34	3.079	0 33 18.5	19.66
170	ι Piscium . .	4.5	23 33 22.07	3.085	4 55 58.4	19.48
171	19 Piscium . .	6	23 39 51.34	3.067	2 46 40.2	20.00
172	26 Piscium . .	6	23 48 35.06	+3.069	+ 6 21 36.7	+20.06
173	ω PISCIMUM . .	4	23 52 44.36	3.078	6 9 17.5	19.94
174	ε <sup>2</sup> Piscium . .	6	23 55 57.39	+3.066	+ 7 46 29.7	+20.02

## FOR WASHINGTON MEAN NOON AND MIDNIGHT

Day of Month.	JANUARY.			FEBRUARY.			MARCH.		
	Semi-diameter.	Horizontal Parallax.	Hourly Diff.	Semi-diameter.	Horizontal Parallax.	Hourly Diff.	Semi-diameter.	Horizontal Parallax.	Hourly Diff.
1	15 10.2	55 33.7	+1.49	15 44.9	57 41.1	+1.77	15 56.8	58 25.1	+1.21
1.5	15 15.3	55 52.5	1.65	15 50.7	58 2.6	1.82	16 0.7	58 39.4	1.18
2.0	15 20.9	56 13.1	1.79	15 56.7	58 24.5	1.84	16 4.4	58 53.3	1.13
2.5	15 27.0	56 35.5	1.93	16 2.7	58 46.5	1.84	16 8.1	59 6.5	1.07
3.0	15 33.5	56 59.5	2.05	16 8.7	59 8.3	1.79	16 11.5	59 18.8	0.99
3.5	15 40.4	57 24.8	2.16	16 14.3	59 29.3	1.71	16 14.5	59 30.1	0.88
4.0	15 47.6	57 51.2	2.25	16 19.7	59 49.0	1.58	16 17.2	59 39.8	0.75
4.5	15 55.1	58 18.5	2.29	16 24.6	60 6.9	1.41	16 19.4	59 47.8	0.58
5.0	16 2.6	58 46.1	2.30	16 28.8	60 22.4	1.18	16 21.0	59 53.7	0.39
5.5	16 10.0	59 13.4	2.25	16 32.2	60 35.0	0.92	16 22.0	59 57.1	+0.18
6.0	16 17.2	59 39.8	2.16	16 34.7	60 44.1	0.61	16 22.2	59 57.8	-0.05
6.5	16 24.0	60 4.7	2.00	16 36.2	60 49.4	+0.27	16 21.5	59 55.7	0.30
7.0	16 30.1	60 27.3	1.78	16 36.5	60 50.5	-0.08	16 20.1	59 50.6	0.56
7.5	16 35.4	60 46.9	1.49	16 35.6	60 47.3	0.45	16 17.9	59 42.3	0.82
8.0	16 39.8	61 2.8	1.16	16 33.5	60 39.8	0.80	16 14.8	59 31.1	1.06
8.5	16 43.0	61 14.5	0.79	16 30.3	60 28.1	1.14	16 11.0	59 17.0	1.29
9.0	16 44.9	61 21.5	+0.38	16 26.1	60 12.5	1.45	16 6.4	59 0.3	1.49
9.5	16 45.4	61 23.4	-0.05	16 20.9	59 53.4	1.72	16 1.3	58 41.3	1.67
10.0	16 44.5	61 20.3	0.47	16 14.9	59 31.4	1.95	15 55.6	58 20.5	1.80
10.5	16 42.3	61 12.1	0.89	16 8.2	59 6.9	2.12	15 49.5	57 58.2	1.90
11.0	16 38.8	60 59.2	1.27	16 1.1	58 40.7	2.24	15 43.2	57 35.1	1.96
11.5	16 34.1	60 41.9	1.61	15 53.7	58 13.5	2.30	15 36.8	57 11.5	1.97
12.0	16 28.4	60 20.8	1.90	15 46.2	57 45.8	2.31	15 30.4	56 47.9	1.95
12.5	16 21.8	59 56.6	2.13	15 38.7	57 18.3	2.28	15 24.1	56 24.9	1.89
13.0	16 14.5	59 30.0	2.30	15 31.3	56 51.1	2.20	15 18.1	56 2.8	1.79
13.5	16 6.8	59 1.8	2.41	15 24.3	56 25.8	2.08	15 12.4	55 42.0	1.67
14.0	15 58.9	58 32.6	2.45	15 17.8	56 1.6	1.93	15 7.2	55 23.0	1.51
14.5	15 50.9	58 3.3	2.45	15 11.8	55 39.4	1.76	15 2.6	55 5.9	1.34
15.0	15 43.0	57 34.2	2.39	15 6.3	55 19.3	1.58	14 58.5	54 50.9	1.15
15.5	15 35.3	57 6.1	2.30	15 1.4	55 1.5	1.39	14 55.1	54 38.3	0.95
16.0	15 28.0	56 39.2	2.17	14 57.2	54 46.1	1.18	14 52.4	54 28.2	0.74
16.5	15 21.2	56 14.2	2.02	14 53.7	54 33.2	0.97	14 50.3	54 20.6	0.52
17.0	15 14.9	55 51.0	1.85	14 50.9	54 22.9	0.75	14 48.9	54 15.6	0.30
17.5	15 9.1	55 29.9	1.67	14 48.8	54 15.2	0.54	14 48.3	54 13.3	-0.09
18.0	15 4.0	55 11.1	1.48	14 47.4	54 9.9	0.34	14 48.3	54 13.5	+0.13
18.5	14 59.5	54 54.5	1.28	14 46.6	54 6.9	-0.14	14 49.1	54 16.3	0.33
19.0	14 55.6	54 40.2	1.09	14 46.4	54 6.3	+0.04	14 50.5	54 21.5	0.53
19.5	14 52.3	54 28.2	0.90	14 46.8	54 7.9	0.21	14 52.6	54 28.9	0.71
20.0	14 49.7	54 18.5	0.72	14 47.8	54 11.4	0.38	14 55.2	54 38.5	0.88
20.5	14 47.6	54 10.9	0.55	14 49.2	54 16.8	0.52	14 58.3	54 50.0	1.03
21.0	14 46.1	54 5.3	0.38	14 51.1	54 23.9	0.65	15 1.8	55 3.1	1.16
21.5	14 45.1	54 1.7	0.22	14 53.5	54 32.4	0.77	15 5.8	55 17.7	1.27
22.0	14 44.6	53 59.9	-0.07	14 56.2	54 42.2	0.87	15 10.1	55 33.4	1.35
22.5	14 44.6	53 59.8	+0.06	14 59.2	54 53.2	0.95	15 14.6	55 50.0	1.41
23.0	14 45.0	54 1.3	0.18	15 2.4	55 5.1	1.02	15 19.3	56 7.2	1.45
23.5	14 45.8	54 4.2	0.30	15 5.8	55 17.7	1.08	15 24.0	56 24.7	1.46
24.0	14 46.9	54 8.4	0.40	15 9.4	55 30.9	1.12	15 28.8	56 42.2	1.46
24.5	14 48.4	54 13.8	0.50	15 13.1	55 44.6	1.16	15 33.5	56 59.4	1.42
25.0	14 50.2	54 20.4	0.59	15 17.0	55 58.7	1.18	15 38.0	57 16.1	1.36
25.5	14 52.3	54 28.0	0.68	15 20.9	56 13.0	1.20	15 42.4	57 32.1	1.30
26.0	14 54.7	54 36.7	0.77	15 24.8	56 27.5	1.21	15 46.5	57 47.2	1.22
26.5	14 57.3	54 46.4	0.85	15 28.8	56 42.1	1.22	15 50.3	58 1.2	1.13
27.0	15 0.2	54 57.2	0.93	15 32.8	56 56.9	1.23	15 53.8	58 14.1	1.02
27.5	15 3.4	55 8.9	1.02	15 36.8	57 11.6	1.23	15 57.0	58 25.8	0.92
28.0	15 6.9	55 21.7	1.10	15 40.9	57 26.4	1.23	15 59.9	58 36.2	0.82
28.5	15 10.6	55 35.5	1.19	15 44.9	57 41.2	1.23	16 2.4	58 45.4	0.71
29.0	15 14.7	55 50.3	1.28	15 48.9	57 55.9	1.22	16 4.5	58 53.3	0.61
29.5	15 19.0	56 6.2	1.37	15 52.9	58 10.6	1.22	16 6.3	59 0.0	0.51
30.0	15 23.6	56 23.2	1.46	15 56.8	58 25.1	1.21	16 7.9	59 5.6	0.42
30.5	15 28.5	56 41.2	1.54	16 0.7	58 39.4	+1.18	16 9.1	59 10.0	0.32
31.0	15 33.7	57 0.2	1.63	$\Delta s = .272 \Delta \pi$			16 10.0	59 13.3	0.23
31.5	15 39.2	57 20.2	+1.70				16 10.5	59 15.5	+0.13

## FOR WASHINGTON MEAN NOON AND MIDNIGHT.

Day of Month.	APRIL.			MAY.			JUNE.		
	Semi-diameter.	Horizontal Parallax.	Hourly Diff.	Semi-diameter.	Horizontal Parallax.	Hourly Diff.	Semi-diameter.	Horizontal Parallax.	Hourly Diff.
d									
1.0	16 10.8	59 16.5	+0.03	16 0.2	58 37.3	-1.00	15 27.9	56 36.9	-1.41
1.5	16 10.8	59 16.4	-0.07	15 56.8	58 25.0	1.05	15 23.4	56 22.4	1.35
2.0	16 10.4	59 14.8	0.18	15 53.3	58 12.1	1.09	15 19.1	56 6.5	1.21
2.5	16 9.6	59 12.0	0.29	15 49.7	57 58.8	1.13	15 15.0	55 51.4	1.23
3.0	16 8.5	59 7.8	0.42	15 46.0	57 45.1	1.16	15 11.1	55 37.0	1.17
3.5	16 6.9	59 2.0	0.55	15 42.1	57 31.0	1.19	15 7.4	55 23.4	1.10
4.0	16 4.9	58 54.6	0.68	15 38.2	57 16.6	1.22	15 3.9	55 10.6	1.03
4.5	16 2.4	58 45.5	0.82	15 34.2	57 1.9	1.24	15 0.6	54 58.7	0.95
5.0	15 59.5	58 34.8	0.96	15 30.1	56 47.0	1.25	14 57.7	54 47.8	0.88
5.5	15 56.1	58 22.5	1.09	15 26.0	56 31.9	1.26	14 54.9	54 37.7	0.80
6.0	15 52.3	58 8.6	1.22	15 21.9	56 16.7	1.26	14 52.5	54 28.7	0.71
6.5	15 48.2	57 53.3	1.33	15 17.8	56 1.6	1.25	14 50.3	54 20.8	0.61
7.0	15 43.7	57 36.8	1.42	15 13.7	55 46.7	1.23	14 48.5	54 14.0	0.51
7.5	15 38.9	57 19.3	1.50	15 9.7	55 32.2	1.19	14 47.0	54 8.6	0.40
8.0	15 34.0	57 1.1	1.55	15 5.9	55 18.2	1.14	14 45.9	54 4.6	0.27
8.5	15 28.9	56 42.4	1.57	15 2.3	55 4.9	1.07	14 45.2	54 2.1	-0.13
9.0	15 23.7	56 23.5	1.57	14 59.0	54 52.6	0.98	14 45.0	54 1.4	+0.02
9.5	15 18.7	56 4.9	1.54	14 56.0	54 41.4	0.88	14 45.4	54 2.7	0.19
10.0	15 13.8	55 46.8	1.48	14 53.3	54 31.6	0.76	14 46.3	54 6.0	0.36
10.5	15 9.1	55 29.6	1.39	14 51.0	54 23.4	0.62	14 47.7	54 11.3	0.54
11.0	15 4.7	55 13.6	1.28	14 49.2	54 16.9	0.47	14 49.8	54 18.9	0.73
11.5	15 0.7	54 59.0	1.15	14 48.0	54 12.3	0.30	14 52.5	54 28.8	0.92
12.0	14 57.2	54 46.2	1.00	14 47.3	54 9.8	-0.12	14 55.9	54 41.1	1.12
12.5	14 54.3	54 35.3	0.82	14 47.2	54 9.6	+0.08	14 59.8	54 55.8	1.32
13.0	14 51.9	54 26.5	0.63	14 47.0	54 11.8	0.28	15 4.4	55 12.7	1.51
13.5	14 50.1	54 20.1	0.43	14 49.1	54 16.4	0.49	15 9.7	55 31.9	1.70
14.0	14 49.0	54 16.1	0.23	14 51.1	54 23.5	0.70	15 15.5	55 53.3	1.87
14.5	14 48.6	54 14.6	-0.02	14 53.7	54 33.1	0.91	15 21.9	56 16.8	2.03
15.0	14 49.0	54 15.7	+0.20	14 57.0	54 45.3	1.12	15 28.8	56 42.1	2.17
15.5	14 50.0	54 19.5	0.42	15 1.0	55 0.0	1.32	15 36.1	57 8.8	2.28
16.0	14 51.7	54 25.8	0.64	15 5.6	55 17.0	1.51	15 43.7	57 36.7	2.36
16.5	14 54.1	54 34.7	0.84	15 10.8	55 36.2	1.69	15 51.4	58 5.2	2.31
17.0	14 57.2	54 46.0	1.04	15 16.6	55 57.4	1.85	15 59.2	58 33.8	2.37
17.5	15 0.9	54 59.6	1.22	15 22.9	56 20.5	1.99	16 6.9	59 1.9	2.31
18.0	15 5.2	55 15.3	1.39	15 29.6	56 45.0	2.09	16 14.2	59 28.8	2.18
18.5	15 10.0	55 32.9	1.54	15 36.5	57 10.5	2.16	16 21.0	59 53.9	1.91
19.0	15 15.2	55 52.1	1.66	15 43.6	57 36.6	2.19	16 27.1	60 16.4	1.75
19.5	15 20.8	56 12.6	1.75	15 50.8	58 2.7	2.17	16 32.4	60 35.6	1.46
20.0	15 26.6	56 34.1	1.82	15 57.7	58 28.4	2.11	16 36.6	61 51.0	1.12
20.5	15 32.6	56 56.1	1.84	16 4.4	58 53.0	1.99	16 39.6	61 2.2	0.75
21.0	15 38.6	57 18.1	1.84	16 10.7	59 16.0	1.83	16 41.4	61 8.9	+0.36
21.5	15 44.5	57 39.9	1.79	16 16.3	59 36.7	1.62	16 41.9	61 10.9	-0.03
22.0	15 50.2	58 0.9	1.71	16 21.2	59 54.6	1.37	16 41.2	61 8.2	0.42
22.5	15 55.6	58 20.7	1.59	16 25.3	60 9.4	1.09	16 39.3	61 0.9	0.79
23.0	16 0.6	58 38.9	1.44	16 28.4	60 20.7	0.79	16 36.1	60 49.4	1.12
23.5	16 5.0	58 55.2	1.27	16 30.4	60 28.3	0.47	16 32.0	60 34.2	1.42
24.0	16 8.9	59 9.3	1.08	16 31.4	60 32.0	+0.15	16 27.0	60 15.7	1.66
24.5	16 12.1	59 21.0	0.87	16 31.4	60 31.9	-0.16	16 21.2	59 54.7	1.85
25.0	16 14.6	59 30.2	0.66	16 30.4	60 28.2	0.46	16 15.0	59 31.7	1.98
25.5	16 16.3	59 36.7	0.44	16 28.4	60 21.1	0.73	16 8.4	59 7.4	2.06
26.0	16 17.4	59 40.7	0.23	16 25.6	60 10.9	0.96	16 1.6	58 42.4	2.10
26.5	16 17.8	59 42.3	+0.03	16 22.2	59 58.1	1.16	15 54.7	58 17.1	2.11
27.0	16 17.6	59 41.5	-0.16	16 18.1	59 43.2	1.32	15 47.9	57 52.1	2.07
27.5	16 16.8	59 38.6	0.33	16 13.5	59 26.5	1.45	15 41.2	57 27.7	2.00
28.0	16 15.5	59 33.7	0.48	16 8.7	59 8.6	1.54	15 34.8	57 4.2	1.92
28.5	16 13.8	59 27.2	0.60	16 3.6	58 49.8	1.59	15 28.7	56 41.8	1.82
29.0	16 11.6	59 19.3	0.71	15 58.4	58 30.6	1.62	15 23.0	56 20.7	1.70
29.5	16 9.1	59 10.2	0.81	15 53.0	58 11.2	1.62	15 17.6	56 1.0	1.58
30.0	16 6.3	59 0.0	0.88	15 47.8	57 51.8	1.63	15 12.7	55 42.8	1.46
30.5	16 3.3	58 49.0	-0.95	15 42.6	57 32.8	1.57	15 8.1	55 26.2	1.33
31.0				15 37.5	57 14.2	1.53	15 4.0	55 11.1	1.29
31.5				15 32.6	56 56.3	-1.47	15 0.3	54 57.4	-1.08

 $\Delta s = 292 \Delta \pi$

## FOR WASHINGTON MEAN NOON AND MIDNIGHT.

Day of Month.	JULY.			AUGUST.			SEPTEMBER.		
	Semi-diameter.	Horizontal Parallax.	Hourly Diff.	Semi-diameter.	Horizontal Parallax.	Hourly Diff.	Semi-diameter.	Horizontal Parallax.	Hourly Diff.
d	15 4.0	55 11.1	-1.20	14 45.3	54 2.2	-0.34	14 45.8	54 19.0	+0.50
1.0	15 0.3	54 57.4	1.08	14 44.4	53 50.0	0.21	14 51.9	54 26.7	0.69
1.5	14 57.0	54 45.2	0.95	14 43.9	53 57.1	-0.09	14 54.3	54 35.5	0.78
2.0	14 54.1	54 34.5	0.83	14 43.8	53 56.7	+0.03	14 57.0	54 45.3	0.86
2.5	14 51.6	54 25.1	0.72	14 44.0	53 57.7	0.14	14 59.9	54 56.1	0.93
3.0	14 49.5	54 17.1	0.61	14 44.7	54 0.0	0.25	15 3.1	55 7.8	1.00
3.5	14 47.7	54 10.5	0.50	14 45.7	54 3.7	0.36	15 6.5	55 20.2	1.07
4.0	14 46.2	54 5.1	0.39	14 47.0	54 8.6	0.47	15 10.1	55 33.5	1.14
4.5	14 45.0	54 1.1	0.29	14 48.7	54 14.9	0.57	15 13.9	55 47.5	1.20
5.0	14 44.2	53 58.3	0.18	14 50.8	54 22.5	0.68	15 17.9	56 2.3	1.26
5.5	14 43.8	53 56.8	-0.07	14 53.2	54 31.3	0.79	15 22.2	56 17.8	1.32
6.0	14 43.7	53 56.7	+0.04	14 56.0	54 41.5	0.91	15 26.6	56 33.9	1.38
6.5	14 44.1	53 57.9	0.16	14 59.1	54 53.2	1.03	15 31.2	56 50.8	1.43
7.0	14 44.8	54 0.6	0.29	15 2.7	55 6.3	1.15	15 36.0	57 8.3	1.48
7.5	14 46.0	54 5.0	0.44	15 6.7	55 20.9	1.28	15 40.9	57 26.4	1.53
8.0	14 47.7	54 11.2	0.59	15 11.1	55 37.0	1.40	15 45.9	57 44.9	1.56
8.5	14 49.9	54 19.2	0.75	15 15.9	55 54.6	1.53	15 51.1	58 3.8	1.59
9.0	14 52.5	54 29.1	0.91	15 21.1	56 13.6	1.65	15 56.2	58 22.9	1.59
9.5	14 55.8	54 41.0	1.08	15 26.6	56 34.0	1.77	16 1.4	58 41.9	1.58
10.0	14 59.6	54 55.0	1.25	15 32.6	56 55.9	1.88	16 6.5	59 0.6	1.53
10.5	15 4.0	55 11.0	1.42	15 38.9	57 19.1	1.97	16 11.4	59 18.6	1.46
11.0	15 8.9	55 29.0	1.58	15 45.4	57 43.1	2.04	16 16.0	59 35.5	1.36
11.5	15 14.3	55 48.9	1.75	15 52.1	58 7.8	2.08	16 20.2	59 51.0	1.21
12.0	15 20.3	56 10.8	1.90	15 59.0	58 32.9	2.09	16 23.9	60 4.5	1.03
12.5	15 26.7	56 34.5	2.05	16 5.8	58 58.0	2.08	16 26.9	60 15.6	0.82
13.0	15 33.6	56 59.8	2.17	16 12.5	59 22.6	2.02	16 29.2	60 23.9	0.56
13.5	15 40.9	57 26.5	2.28	16 18.9	59 46.1	1.90	16 30.6	60 28.9	+0.28
14.0	15 48.4	57 54.3	2.34	16 24.8	60 7.8	1.73	16 31.0	60 30.5	-0.02
14.5	15 56.2	58 22.6	2.38	16 31.1	60 27.2	1.51	16 30.4	60 28.4	0.33
15.0	16 3.9	58 51.0	2.37	16 34.6	60 43.7	1.24	16 28.8	60 22.5	0.65
15.5	16 11.5	59 19.0	2.29	16 38.1	60 56.6	0.92	16 26.2	60 12.8	0.96
16.0	16 18.8	59 45.7	2.17	16 43.5	61 5.5	0.56	16 22.6	59 59.5	1.26
16.5	16 25.6	60 10.6	1.98	16 41.7	61 10.0	+0.18	16 18.0	59 42.8	1.52
17.0	16 31.7	60 33.0	1.74	16 41.7	61 9.9	-0.21	16 12.7	59 23.3	1.74
17.5	16 36.9	60 52.1	1.44	16 40.4	61 5.1	0.60	16 6.7	59 1.3	1.92
18.0	16 41.0	61 7.2	1.09	16 37.8	60 55.6	0.98	16 0.2	58 37.4	2.06
18.5	16 43.9	61 18.0	0.71	16 34.0	60 41.7	1.33	15 53.3	58 12.2	2.15
19.0	16 45.5	61 24.0	+0.20	16 29.1	60 23.8	1.64	15 46.3	57 46.2	2.18
19.5	16 45.8	61 25.0	-0.13	16 23.3	60 2.5	1.91	15 39.2	57 20.0	2.18
20.0	16 44.7	61 23.8	0.55	16 16.8	59 38.3	2.12	15 32.1	56 54.2	2.12
20.5	16 42.2	61 11.8	0.95	16 9.6	59 12.0	2.27	15 25.3	56 29.3	2.03
21.0	16 38.5	60 58.2	1.31	16 2.0	58 44.2	2.36	15 18.9	56 5.7	1.91
21.5	16 33.7	60 40.5	1.64	15 54.3	58 15.7	2.39	15 12.9	55 43.7	1.76
22.0	16 27.9	60 19.2	1.90	15 46.5	57 47.1	2.38	15 7.4	55 23.6	1.59
22.5	16 21.3	59 55.1	2.11	15 38.8	57 18.9	2.32	15 2.5	55 5.7	1.40
23.0	16 14.2	59 28.9	2.26	15 31.4	56 51.6	2.22	14 58.3	54 50.1	1.20
23.5	16 6.7	59 1.3	2.34	15 24.4	56 25.7	2.09	14 54.7	54 37.0	0.99
24.0	15 59.0	58 2.9	2.38	15 17.8	56 1.6	1.94	14 51.9	54 26.4	0.78
24.5	15 51.2	58 4.5	2.37	15 11.7	55 39.4	1.76	14 49.7	54 18.4	0.56
25.0	15 43.6	57 36.4	2.31	15 6.2	55 19.3	1.58	14 48.2	54 13.0	0.35
25.5	15 36.2	57 9.2	2.22	15 1.4	55 1.5	1.39	14 47.4	54 10.0	-0.14
26.0	15 29.1	56 43.3	2.10	14 57.2	54 46.0	1.19	14 47.2	54 9.5	+0.06
26.5	15 22.5	56 19.0	1.96	14 53.6	54 32.9	0.99	14 47.7	54 11.3	0.24
27.0	15 16.4	55 56.5	1.80	14 50.7	54 22.2	0.79	14 48.8	54 15.3	0.42
27.5	15 10.8	55 35.9	1.64	14 48.5	54 13.9	0.60	14 50.5	54 21.3	0.58
28.0	15 5.7	55 17.2	1.47	14 46.8	54 7.8	0.42	14 52.6	54 29.2	0.73
28.5	15 1.2	55 0.5	1.30	14 45.7	54 3.9	0.24	14 55.2	54 38.7	0.86
29.0	14 57.2	54 45.9	1.13	14 45.2	54 2.0	-0.07	14 58.2	54 49.7	0.97
29.5	14 53.7	54 33.3	0.96	14 45.2	54 2.1	+0.08	15 1.5	55 2.0	1.07
30.0	14 50.8	54 22.7	0.80	14 45.7	54 4.0	0.22	15 5.1	55 15.2	+1.14
30.5	14 48.5	54 14.0	0.64	14 46.7	54 7.5	0.36			
31.0	14 46.6	54 7.2	-0.49	14 48.1	54 12.6	+0.48			
31.5									

 $\Delta s = .272 \Delta \pi$

## FOR WASHINGTON MEAN NOON AND MIDNIGHT.

Day of Month.	OCTOBER.			NOVEMBER.			DECEMBER.		
	Semi-diameter.	Horizontal Parallax.	Hourly Diff.	Semi-diameter.	Horizontal Parallax.	Hourly Diff.	Semi-diameter.	Horizontal Parallax.	Hourly Diff.
1.0	15 9.0	55 29.2	+1.20	15 47.7	57 51.7	+1.39	16 16.4	59 44.2	+0.95
1.5	15 12.9	55 43.8	1.24	15 52.1	58 7.7	1.28	16 21.1	59 54.0	0.69
2.0	15 17.0	55 58.9	1.27	15 56.1	58 22.3	1.15	16 22.9	60 0.6	0.41
2.5	15 21.2	56 14.1	1.27	15 59.6	58 35.3	1.01	16 23.8	60 4.0	+0.14
3.0	15 25.3	56 29.4	1.27	16 2.7	58 46.5	0.86	16 23.8	60 4.2	-0.11
3.5	15 29.4	56 44.5	1.25	16 5.2	58 55.9	0.71	16 23.1	60 1.4	0.35
4.0	15 33.5	56 59.5	1.24	16 7.3	59 3.4	0.55	16 21.6	59 55.9	0.57
4.5	15 37.5	57 14.2	1.21	16 8.8	59 9.2	0.41	16 19.4	59 48.0	0.75
5.0	15 41.4	57 28.5	1.18	16 10.0	59 13.4	0.28	16 16.7	59 38.1	0.88
5.5	15 45.2	57 42.4	1.14	16 10.7	59 16.0	0.15	16 13.5	59 26.5	1.02
6.0	15 48.9	57 55.9	1.10	16 11.0	59 17.1	+0.04	16 10.0	59 13.6	1.12
6.5	15 52.5	58 8.8	1.06	16 10.9	59 16.9	-0.07	16 6.3	58 59.7	1.19
7.0	15 55.9	58 21.3	1.02	16 10.5	59 15.5	0.17	16 2.3	58 45.2	1.23
7.5	15 59.1	58 33.2	0.97	16 9.8	59 12.9	0.26	15 58.2	58 30.2	1.26
8.0	16 2.1	58 44.6	0.92	16 8.8	59 9.2	0.35	15 54.1	58 14.9	1.28
8.5	16 5.0	58 55.2	0.86	16 7.6	59 4.5	0.44	15 49.9	57 59.5	1.28
9.0	16 7.7	59 5.0	0.79	16 6.0	58 58.7	0.52	15 45.7	57 44.2	1.28
9.5	16 10.2	59 14.0	0.70	16 4.1	58 51.9	0.61	15 41.5	57 28.9	1.27
10.0	16 12.3	59 21.9	0.61	16 2.0	58 44.0	0.70	15 37.4	57 13.7	1.26
10.5	16 14.1	59 28.5	0.50	15 59.6	58 35.1	0.79	15 33.3	56 58.6	1.25
11.0	16 15.5	59 33.6	0.36	15 56.8	58 25.1	0.88	15 29.2	56 43.7	1.24
11.5	16 16.4	59 36.9	0.21	15 53.8	58 13.9	0.97	15 25.2	56 29.0	1.22
12.0	16 16.8	59 38.3	+0.04	15 50.4	58 1.5	1.07	15 21.3	56 14.5	1.20
12.5	16 16.6	59 37.6	-0.15	15 46.7	57 48.1	1.16	15 17.4	56 0.2	1.17
13.0	16 15.8	59 34.6	0.36	15 42.8	57 33.7	1.24	15 13.6	55 46.3	1.15
13.5	16 14.3	59 29.1	0.56	15 38.7	57 18.4	1.31	15 9.9	55 32.7	1.12
14.0	16 12.1	59 21.1	0.77	15 34.3	57 2.3	1.37	15 6.3	55 19.5	1.08
14.5	16 9.2	59 10.7	0.97	15 29.8	56 45.6	1.41	15 2.9	55 6.9	1.02
15.0	16 5.7	58 57.8	1.17	15 25.2	56 28.6	1.42	14 59.6	54 55.0	0.96
15.5	16 1.6	58 42.6	1.35	15 20.5	56 11.5	1.42	14 56.6	54 44.0	0.88
16.0	15 56.9	58 25.5	1.51	15 15.8	55 54.5	1.41	14 53.9	54 33.9	0.79
16.5	15 51.8	58 6.6	1.63	15 11.3	55 37.9	1.36	14 51.5	54 25.0	0.69
17.0	15 46.3	57 46.3	1.73	15 7.0	55 22.0	1.29	14 49.4	54 17.5	0.57
17.5	15 40.5	57 25.1	1.80	15 2.9	55 7.1	1.19	14 47.8	54 11.5	0.43
18.0	15 34.6	57 3.4	1.82	14 59.2	54 53.5	1.08	14 46.6	54 7.2	0.28
18.5	15 28.7	56 41.5	1.82	14 55.9	54 41.4	0.94	14 45.9	54 4.7	-0.12
19.0	15 22.8	56 20.0	1.78	14 53.1	54 31.0	0.79	14 45.8	54 4.3	+0.06
19.5	15 17.1	55 59.1	1.70	14 50.8	54 22.7	0.61	14 46.3	54 6.2	0.25
20.0	15 11.7	55 39.4	1.59	14 49.1	54 16.5	0.42	14 47.5	54 10.4	0.45
20.5	15 6.7	55 21.1	1.46	14 48.1	54 12.6	0.22	14 49.3	54 17.0	0.65
21.0	15 2.2	55 4.6	1.30	14 47.7	54 11.2	-0.02	14 51.8	54 26.0	0.85
21.5	14 58.3	54 50.1	1.12	14 48.0	54 12.4	+0.20	14 54.9	54 37.5	1.07
22.0	14 55.0	54 37.9	0.92	14 49.1	54 16.2	0.43	14 58.7	54 51.7	1.28
22.5	14 52.3	54 28.0	0.72	14 50.8	54 22.7	0.65	15 3.3	55 8.4	1.49
23.0	14 50.3	54 20.6	0.51	14 53.3	54 31.8	0.87	15 8.5	55 27.5	1.69
23.5	14 49.0	54 15.8	0.29	14 56.5	54 43.4	1.07	15 14.3	55 48.9	1.87
24.0	14 48.4	54 13.7	-0.07	15 0.3	54 57.5	1.26	15 20.7	56 12.3	2.03
24.5	14 48.5	54 14.2	+0.15	15 4.8	55 14.0	1.46	15 27.6	56 37.5	2.17
25.0	14 49.4	54 17.3	0.37	15 9.8	55 32.6	1.63	15 34.8	57 4.2	2.27
25.5	14 50.9	54 22.9	0.58	15 15.4	55 53.1	1.78	15 42.4	57 31.9	2.34
26.0	14 53.1	54 31.0	0.77	15 21.4	56 15.1	1.89	15 50.1	58 0.2	2.36
26.5	14 55.9	54 41.4	0.95	15 27.8	56 38.3	1.98	15 57.7	58 28.3	2.33
27.0	14 59.3	54 53.8	1.12	15 34.3	57 2.3	2.02	16 5.2	58 55.8	2.25
27.5	15 3.2	55 8.1	1.26	15 40.9	57 26.6	2.03	16 12.3	59 21.9	2.10
28.0	15 7.5	55 24.0	1.39	15 47.5	57 50.8	2.00	16 18.8	59 45.9	1.91
28.5	15 12.2	55 41.3	1.49	15 53.9	58 14.3	1.92	16 24.7	60 7.3	1.66
29.0	15 17.2	55 59.6	1.56	16 0.0	58 36.5	1.79	16 29.6	60 25.5	1.36
29.5	15 22.4	56 18.6	1.60	16 5.6	58 57.1	1.63	16 33.5	60 39.9	1.03
30.0	15 27.7	56 37.9	1.61	16 10.6	59 15.5	1.43	16 36.3	60 50.0	0.67
30.5	15 33.0	56 57.2	1.60	16 14.9	59 31.3	+1.20	16 37.9	60 55.8	+0.29
31.0	15 38.1	57 16.2	1.56	$\Delta s = .272 \Delta \pi$			16 38.2	60 57.0	-0.08
31.5	15 43.0	57 34.4	+1.49				16 37.3	60 53.8	-0.44

## WASHINGTON MEAN TIME.

## PHASES.

Month.	Last Quarter.	New Moon.	First Quarter.	Full Moon.	Last Quarter.	New Moon.
	d h m	d h m	d h m	d h m		
January	3 4 51.0	9 21 49.8	16 18 53.9	25 0 6.4		
February	1 17 2.4	8 8 43.9	15 13 15.9	23 17 48.2	d h m	
March	2 2 20.6	8 19 45.3	16 9 16.9	24 8 35.4	31 9 23.9	
April		7 7 23.8	15 5 3.1	22 20 29.2	29 15 13.2	
May		6 20 10.7	14 22 57.2	22 6 0.4	28 21 4.7	
June		5 10 15.3	13 14 10.9	20 13 49.8	27 4 19.4	
July		5 1 16.6	13 2 40.0	19 20 45.3	26 14 11.1	
August		3 16 37.5	11 12 44.2	18 3 45.1	25 3 27.0	
September		2 7 45.1	9 20 55.3	16 11 56.5	23 20 13.5	d h m
October		1 22 22.5	9 3 55.7	15 22 26.5	23 15 45.5	31 12 20.0
November			7 10 43.0	14 12 0.3	22 12 37.1	30 1 26.5
December			6 18 28.0	14 4 35.9	22 9 3.7	29 13 27.9

## APOGEE, PERIGEE, AND GREATEST LIBRATION.

Month.	Perigee.	Apogee.	Perigee.	GREATEST LIBRATION.		
	d h	d h	d h	d h m	d h m	d h m
January	9 10.7	22 6.6		3 6 45 s.e.	15 8 53 s.w.	31 6 19 s.e.
February	6 21.2	18 21.3			12 16 4 s.w.	27 4 32 s.e.
March	5 21.3	17 16.9	d h		11 16 7 s.w.	24 10 0 s.e.
April	1 4.5	14 13.0	26 13.7		8 2 26 s.w.	20 14 45 s.e.
May		12 7.1	24 5.7	4 14 10 s.w.	18 9 30 s.e.	31 4 11 s.w.
June		8 22.3	21 11.1		15 13 9 s.e.	27 19 52 s.w.
July		6 7.3	19 20.2		13 17 58 s.e.	25 22 16 s.w.
August		2 9.2	17 5.6		10 20 28 s.e.	23 3 14 s.w.
August		29 17.4				
September	14 11.3	26 8.7			7 11 43 s.e.	20 6 4 s.w.
October	12 2.3	24 3.8		3 23 9 s.e.	18 1 35 s.w.	30 12 3 s.e.
November	6 4.0	21 0.8		14 4 29 s.w.	27 0 46 s.e.	
December	2 18.8	18 20.2	30 21.3	10 7 57 s.w.	25 2 32 s.e.	

## MOON'S EQUATOR.

The moon's libration in latitude and longitude, at any time, may be found by means of the following formulas and tables:

$I$  = the inclination to the ecliptic of the moon's equator =  $1^{\circ} 28'.8$ .

$\Omega$  = mean longitude of the moon's ascending node (see page 250).

= mean longitude of the descending node of the moon's equator.

$C$  = the angle at the centre of the moon's disc made by a meridian of the moon with the circle of declination, reckoned from north to east on the apparent disc.

$i$ ,  $\Delta$ ,  $\Omega'$ , and  $\zeta$  are defined on the next page, where their values for the year are given.

$\lambda$ ,  $\beta$ ,  $\alpha'$ , and  $\delta'$  the apparent longitude, latitude, right ascension, and declination of the moon affected with parallax.

$\lambda'$  = the selenocentric longitude of the earth, reckoned on the moon's equator from its descending node,  $\Omega$ .

$$\left. \begin{aligned} \Delta \lambda &= -0'.57 \sin 2(\Omega - \lambda) \\ \alpha &= \sin I \cos(\Omega - \lambda) \\ \tan B &= \tan I \sin(\Omega - \lambda) \\ \lambda' &= \lambda + \Delta \lambda + \alpha b \end{aligned} \right\} \text{See table, page 345.}$$

The libration in latitude =  $b = B - \beta$ ,

" " longitude =  $l = \lambda' - \zeta$ .

$$\sin C = \sin i \frac{\cos(\lambda' + \Delta - \Omega)}{\cos \delta'} = -\sin i \frac{\cos(\alpha' - \Omega')}{\cos \beta}$$

## WASHINGTON MEAN TIME

Mean Noon.		MOON'S EQUATOR.			Moon's Mean Longitude.	Mean Solar Days.	Motion of ☾.
		i Inclination to the Earth's Equator.	Δ Ascending Node on Earth's Equator to Ascending Node on Ecliptic.	Ω' Ascending Node on Earth's Equator.			
Jan.	1	23° 15.7	264° 4.7	356° 18.0	171° 25.5	0.1	1° 19.06
	11	23 14.9	263 32.7	356 18.2	303 11.3	0.2	2 38.12
	21	23 14.1	263 0.7	356 18.5	74 57.2	0.3	3 57.18
	31	23 13.3	262 28.7	356 18.8	206 43.0	0.4	5 16.23
Feb.	10	23 12.5	261 56.7	356 19.1	338 28.9	0.5	6 35.29
						0.6	7 54.35
	20	23 11.7	261 24.7	356 19.4	110 14.7	0.7	9 13.41
March	1	23 10.8	260 52.6	356 19.7	242 0.5	0.8	10 32.47
	11	23 10.0	260 20.5	356 20.0	13 46.4	0.9	11 51.53
	21	23 9.2	259 48.4	356 20.4	145 32.2	1.0	13 10.58
	31	23 8.4	259 16.3	356 20.8	277 18.1	2.0	26 21.17
						3.0	39 31.75
April	10	23 7.6	258 44.1	356 21.2	49 3.9	4.0	52 42.33
	20	23 6.8	258 12.0	356 21.6	180 49.7	5.0	65 52.92
	30	23 6.0	257 39.8	356 22.1	312 35.6	6.0	79 3.50
May	10	23 5.2	257 7.7	356 22.5	84 21.4	7.0	92 14.00
	20	23 4.4	256 35.5	356 23.0	216 7.3	8.0	105 24.67
						9.0	118 35.25
	30	23 3.6	256 3.2	356 23.5	347 53.1	10.0	131 45.84
June	9	23 2.8	255 31.0	356 24.0	119 38.9		
	19	23 2.0	254 56.7	356 24.6	251 24.8	Hours.	
	29	23 1.2	254 26.4	356 25.1	23 10.6	1	0 32.94
July	9	23 0.4	253 54.1	356 25.7	154 56.4	2	1 5.88
						3	1 38.82
	19	22 59.7	253 21.9	356 26.3	286 42.2	4	2 11.76
	29	22 58.9	252 49.6	356 26.9	58 28.0	5	2 44.70
Aug.	8	22 58.1	252 17.2	356 27.5	190 13.9	6	3 17.65
	18	22 57.3	251 44.8	356 28.2	321 59.7	7	3 50.59
	28	22 56.5	251 12.5	356 28.7	93 45.6	8	4 23.53
						9	4 56.47
Sept.	7	22 55.8	250 40.1	356 29.5	225 31.4	10	5 29.41
	17	22 55.0	250 7.7	356 30.3	357 17.2	11	6 2.35
	27	22 54.2	249 35.3	356 31.0	129 3.1	12	6 35.29
Oct.	7	22 53.4	249 2.8	356 31.7	260 48.9	13	7 8.23
	17	22 52.7	248 30.4	356 32.5	32 34.8	14	7 41.17
						15	8 14.11
	27	22 52.0	247 57.9	356 33.3	164 20.6	16	8 47.03
Nov.	6	22 51.1	247 25.4	356 34.1	296 6.4	17	9 20.00
	16	22 50.4	246 52.9	356 34.9	67 52.3	18	9 52.94
	26	22 49.6	246 20.3	356 35.7	199 38.1	19	10 25.88
Dec.	6	22 48.9	245 47.8	356 36.6	331 24.0	20	10 58.82
						21	11 31.76
	16	22 48.1	245 15.2	356 37.4	103 9.8	22	12 4.70
	26	22 47.4	244 42.6	356 38.3	234 55.6	23	12 37.64
	36	22 46.6	244 10.0	356 39.2	6 41.5		

TABLE FOR THE LIBRATION OF THE MOON.

Argument,  $(\Omega - \lambda)$  or  $(\Omega - \lambda - 180^\circ)$ .

$\Omega - \lambda$	$\Delta \lambda$	$a^{-1}$	$B$	$\Omega - \lambda$	$\Omega - \lambda$	$\Delta \lambda$	$a^{-1}$	$B$	$\Omega - \lambda$
0°	0.0	39	0 0.0	180°	46°	0.6	56	1 3.9	134°
1	0.0	39	0 1.6	179	47	0.6	57	1 4.9	133
2	0.0	39	0 3.1	178	48	0.6	58	1 6.0	132
3	0.1	39	0 4.7	177	49	0.6	59	1 7.0	131
4	0.1	39	0 6.2	176	50	0.6	60	1 8.0	130
5	0.1	39	0 7.7	175	51	0.6	62	1 9.0	129
6	0.2	39	0 9.3	174	52	0.6	63	1 10.0	128
7	0.2	39	0 10.8	173	53	0.5	64	1 10.9	127
8	0.2	39	0 12.4	172	54	0.5	66	1 11.8	126
9	0.2	39	0 13.9	171	55	0.5	67	1 12.7	125
10	0.2	39	0 15.4	170	56	0.5	69	1 13.6	124
11	0.3	39	0 16.9	169	57	0.5	71	1 14.5	123
12	0.3	40	0 18.5	168	58	0.5	73	1 15.3	122
13	0.3	40	0 20.0	167	59	0.5	75	1 16.1	121
14	0.3	40	0 21.5	166	60	0.5	77	1 16.9	120
15	0.3	40	0 23.0	165	61	0.5	80	1 17.6	119
16	0.3	40	0 24.5	164	62	0.5	83	1 18.4	118
17	0.3	40	0 26.0	163	63	0.5	86	1 19.1	117
18	0.3	41	0 27.4	162	64	0.5	89	1 19.8	116
19	0.4	41	0 28.9	161	65	0.4	92	1 20.4	115
20	0.4	41	0 30.4	160	66	0.4	95	1 21.1	114
21	0.4	41	0 31.8	159	67	0.4	99	1 21.7	113
22	0.4	42	0 33.2	158	68	0.4	103	1 22.3	112
23	0.4	42	0 34.7	157	69	0.4	108	1 22.9	111
24	0.4	42	0 36.1	156	70	0.4	113	1 23.4	110
25	0.4	43	0 37.5	155	71	0.4	119	1 23.9	109
26	0.5	43	0 38.9	154	72	0.4	125	1 24.4	108
27	0.5	43	0 40.3	153	73	0.4	132	1 24.9	107
28	0.5	44	0 41.7	152	74	0.3	141	1 25.3	106
29	0.5	44	0 43.1	151	75	0.3	150	1 25.7	105
30	0.5	45	0 44.4	150	76	0.3	160	1 26.1	104
31	0.5	45	0 45.7	149	77	0.3	172	1 26.5	103
32	0.5	46	0 47.0	148	78	0.2	186	1 26.8	102
33	0.5	46	0 48.4	147	79	0.2	202	1 27.1	101
34	0.5	47	0 49.7	146	80	0.2	222	1 27.4	100
35	0.5	47	0 51.0	145	81	0.2	247	1 27.7	99
36	0.5	48	0 52.2	144	82	0.2	278	1 27.9	98
37	0.5	48	0 53.4	143	83	0.1	318	1 28.1	97
38	0.6	49	0 54.7	142	84	0.1	370	1 28.3	96
39	0.6	50	0 55.9	141	85	0.1	440	1 28.5	95
40	0.6	50	0 57.1	140	86	0.1	555	1 28.6	94
41	0.6	51	0 58.3	139	87	0.1	740	1 28.7	93
42	0.6	52	0 59.4	138	88	0.0	1110	1 28.7	92
43	0.6	53	1 0.6	137	89	0.0	2220	1 28.8	91
44	0.6	54	1 1.7	136	90	0.0	$\infty$	1 28.8	90
45	0.6	55	1 2.8	135					

 $\Delta \lambda$  has the sign of  $\tan (\lambda - \Omega)$  $a$  has the sign of  $\cos (\Omega - \lambda)$  $B$  has the sign of  $\sin (\Omega - \lambda)$



Date. 1872.	FOR WASHINGTON MEAN NOON.				FOR MERIDIAN TRANSIT.				
	Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Mean Time of Transit.	Apparent Right Ascension.	Diff. for 1 h. of Long.	Apparent Declination.	Diff. for 1 hour of Long.
Jan. 1	18 50 23.00	14.526	-20 24 30.7	+19.63	1 0 7.7	18 50 21.13	14.432	-20 24 26.2	+19.48
-2	18 44 33.06	14.556	20 17 21.1	16.15	1 23 58.0	18 44 33.56	14.460	20 17 21.6	16.05
3	18 38 47.95	14.128	20 11 36.8	12.52	2 23 48.3	18 38 50.70	14.042	20 11 39.2	12.47
4	18 33 18.20	13.287	20 7 21.0	8.77	3 23 38.9	18 33 22.86	13.218	20 7 24.1	8.77
5	18 28 12.90	12.103	20 4 36.7	4.92	4 23 30.0	18 28 18.98	12.057	20 4 39.2	4.97
6	18 23 39.37	10.655	20 3 25.1	+ 1.06	5 23 21.5	18 23 46.23	10.636	20 3 25.8	+ 1.15
7	18 19 42.89	9.028	20 3 45.5	- 2.74	6 23 13.6	18 19 49.91	9.034	20 3 43.4	- 2.61
8	18 16 26.82	7.301	20 5 35.3	6.37	7 23 6.4	18 16 33.39	7.330	20 5 29.7	6.21
9	18 13 52.73	5.539	20 8 49.2	9.74	8 22 59.9	18 13 58.34	5.588	20 8 39.5	9.56
10	18 12 0.80	3.796	20 13 20.1	12.77	9 22 54.1	18 12 5.04	3.860	20 13 6.1	12.59
11	18 10 50.09	2.109	20 18 59.1	15.41	10 22 49.0	18 10 52.68	2.182	20 18 40.9	15.24
12	18 10 18.89	-0.508	20 25 36.2	17.62	11 22 44.5	18 10 19.62	-0.587	20 25 14.0	17.46
13	18 10 24.92	+0.993	20 33 0.9	19.37	12 22 40.6	18 10 23.71	+0.911	20 32 45.3	19.23
14	18 11 5.70	2.387	20 41 2.2	20.67	13 22 37.3	18 11 2.51	2.306	20 40 33.7	20.57
15	18 12 18.60	3.669	20 49 29.4	21.53	14 22 34.6	18 12 13.48	3.590	20 48 58.7	21.46
16	18 14 0.95	4.842	20 58 12.4	21.98	15 22 32.3	18 13 53.98	4.767	20 57 40.2	21.93
17	18 16 10.21	5.913	21 7 1.4	22.04	16 22 30.5	18 16 1.48	5.843	21 6 28.4	22.02
18	18 18 43.99	6.886	21 15 47.4	21.73	17 22 29.1	18 18 33.64	6.822	21 15 14.4	21.74
19	18 21 40.01	7.768	21 24 22.0	21.10	18 22 28.1	18 21 28.19	7.710	21 23 49.6	21.14
20	18 24 56.20	8.568	21 32 37.8	20.17	19 22 27.4	18 24 43.05	8.516	21 32 6.6	20.23
21	18 28 30.69	9.293	21 40 27.8	18.96	20 22 27.0	18 28 16.35	9.247	21 39 58.3	19.04
22	18 32 21.73	9.950	21 47 45.8	17.51	21 22 26.9	18 32 6.36	9.909	21 47 18.5	17.60
23	18 36 27.81	10.546	21 54 26.5	15.85	22 22 27.0	18 36 11.52	10.511	21 54 1.8	15.96
24	18 40 47.48	11.085	22 0 24.9	13.98	23 22 27.4	18 40 30.43	11.056	22 0 3.1	14.11
25	18 45 19.51	11.576	22 5 36.4	11.05	24 22 28.0	18 45 1.81	11.551	22 5 17.9	12.09
26	18 50 2.76	12.021	22 9 57.3	9.76	25 22 28.8	18 49 44.52	12.001	22 9 42.3	9.91
27	18 54 56.19	12.425	22 13 23.9	7.44	26 22 29.7	18 54 37.53	12.409	22 13 12.5	7.69
28	18 59 58.89	12.793	22 15 53.2	4.90	27 22 30.8	18 59 39.90	12.782	22 15 45.6	5.15
29	19 5 10.05	13.130	22 17 22.3	- 2.43	28 22 32.0	19 4 50.83	13.123	22 17 18.5	- 2.59
30	19 10 28.90	13.436	22 17 49.1	+ 0.22	29 22 33.4	19 10 9.53	13.432	22 17 49.2	+ 0.06
31	19 15 54.78	13.716	22 17 10.9	2.97	30 22 34.9	19 15 35.34	13.714	22 17 14.9	2.81
Feb. 1	19 21 27.06	13.971	22 15 25.9	5.79	31 22 36.5	19 21 7.63	13.973	22 15 33.8	5.63
2	19 27 5.21	14.204	22 12 32.5	8.68	1 22 38.2	19 26 45.86	14.208	22 12 44.1	8.53
3	19 32 48.72	14.418	22 8 28.9	11.63	2 22 39.9	19 32 20.49	14.424	22 8 44.2	11.48
4	19 38 37.14	14.614	22 3 14.0	14.63	3 22 41.8	19 38 18.09	14.623	22 3 32.9	14.48
5	19 44 30.04	14.792	21 56 46.3	17.68	4 22 43.7	19 44 11.25	14.803	21 57 8.6	17.54
6	19 50 27.06	14.957	21 49 4.9	20.78	5 22 45.8	19 50 8.56	14.969	21 49 30.4	20.65
7	19 56 27.86	15.108	21 40 8.7	23.91	6 22 47.8	19 56 9.69	15.122	21 40 37.3	23.79
8	20 2 32.12	15.246	21 29 56.9	27.08	7 22 49.9	20 2 14.32	15.262	21 30 28.4	26.97
9	20 8 39.56	15.373	21 18 28.6	30.28	8 22 52.1	20 8 22.17	15.391	21 19 2.8	30.18
10	20 14 49.94	15.490	21 5 43.2	33.51	9 22 54.4	20 14 33.00	15.509	21 6 19.8	33.42
11	20 21 3.02	15.598	20 51 40.1	36.76	10 22 56.6	20 20 46.55	15.618	20 52 18.8	36.68
12	20 27 18.59	15.698	20 36 18.6	40.03	11 22 58.9	20 27 2.62	15.719	20 36 59.3	39.96
13	20 33 36.47	15.791	20 19 38.4	43.32	12 23 1.3	20 33 21.02	15.813	20 20 20.7	43.26
14	20 39 56.50	15.877	20 1 39.0	46.63	13 23 3.7	20 39 41.61	15.900	20 2 22.7	46.58
15	20 46 18.53	15.957	19 42 20.0	49.95	14 23 6.1	20 46 4.20	15.981	19 43 4.8	49.91
16	20 52 42.42	16.032	19 21 41.1	53.29	15 23 8.6	20 52 28.68	16.057	19 22 26.7	53.26
17	20 59 8.06	16.104	18 50 42.0	56.64	16 23 11.1	20 58 54.92	16.130	19 0 28.1	56.62
18	21 5 35.38	16.172	18 36 22.3	60.00	17 23 13.6	21 5 22.87	16.198	18 37 8.7	60.00
19	21 12 4.28	16.236	18 11 42.0	63.36	18 23 16.1	21 11 52.41	16.263	18 12 28.3	63.37
20	21 18 34.70	16.299	17 45 40.9	66.73	19 23 18.7	21 18 23.48	16.326	17 46 26.8	66.75
21	21 25 6.60	16.359	17 18 18.7	70.12	20 23 21.3	21 24 56.05	16.387	17 19 3.9	70.15
22	21 31 30.92	16.418	16 49 35.3	73.50	21 23 23.9	21 31 30.05	16.446	16 50 19.5	73.55
23	21 38 14.64	16.476	16 19 30.7	76.89	22 23 26.6	21 38 5.46	16.505	16 20 13.5	76.95
24	21 44 50.75	16.534	15 48 4.8	80.27	23 23 29.2	21 44 42.27	16.563	15 48 46.0	80.34
25	21 51 28.25	16.592	15 15 17.7	83.65	24 23 31.9	21 51 20.48	16.622	15 15 56.9	83.74
26	21 58 7.15	16.650	14 41 9.4	87.03	25 23 34.6	21 58 0.11	16.680	14 41 46.2	87.13
27	22 4 47.46	16.709	14 5 39.9	90.42	26 23 37.3	22 4 41.15	16.740	14 6 14.0	90.54
28	22 11 29.19	16.770	13 28 49.4	93.78	27 23 40.1	22 11 23.63	16.801	13 29 20.5	93.92
29	22 18 12.39	16.831	12 50 38.4	97.13	28 23 42.9	22 18 7.59	16.863	12 51 6.1	97.28
30	22 24 57.08	16.894	-12 11 7.1	+100.47	29 23 45.7	22 24 53.05	16.926	12 11 31.0	100.63
					30 23 48.5	22 31 40.09	16.993	-11 30 35.7	+103.96

Date. 1872.	FOR WASHINGTON MEAN NOON.				FOR MERIDIAN TRANSIT.				
	Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Mean Time of Transit.	Apparent Right Ascension.	Diff. for 1 h. of Long.	Apparent Declination.	Diff. for 1 hour of Long.
Mar. 1	22 24 57.08	16.894	-12 11 7.1	+100.47	1 23 48.5	22 31 40.09	16.993	-11 30 35.7	+103.96
2	22 31 43.33	16.960	11 30 15.9	103.78	2 23 51.4	22 38 28.71	17.059	10 48 21.1	107.26
3	22 38 31.15	17.026	10 48 5.7	107.06	3 23 54.3	22 45 18.96	17.128	10 4 47.7	110.52
4	22 45 20.59	17.094	10 4 37.2	110.31	4 23 57.2	22 52 10.88	17.198	9 19 56.5	113.74
5	22 52 11.68	17.164	9 19 51.2	113.51					
6	22 59 4.46	17.235	8 33 49.1	116.65	6 0 0.1	22 59 4.50	17.270	8 33 48.8	116.89
7	23 5 58.95	17.306	7 46 32.6	119.72	7 0 3.1	23 5 59.85	17.341	7 46 26.4	119.99
8	23 12 55.15	17.377	6 58 3.4	122.70	8 0 6.1	23 12 56.92	17.413	6 57 50.9	122.98
9	23 19 53.02	17.447	6 8 23.9	125.58	9 0 9.1	23 19 55.68	17.484	6 8 4.8	125.87
10	23 26 52.56	17.514	5 17 36.7	128.33	10 0 12.2	23 26 56.12	17.551	5 17 10.6	128.66
11	23 33 53.65	17.576	4 25 45.4	130.92	11 0 15.3	23 33 58.12	17.614	4 25 12.1	131.24
12	23 40 56.19	17.634	3 32 53.8	133.35	12 0 18.4	23 41 1.59	17.672	3 32 13.0	133.67
13	23 47 59.99	17.682	2 39 6.4	135.56	13 0 21.5	23 48 6.33	17.721	2 38 17.8	135.89
14	23 55 4.82	17.718	1 44 28.9	137.52	14 0 24.7	23 55 12.10	17.757	1 43 32.4	137.85
15	0 2 10.36	17.741	-0 0 49 7.6	139.20	15 0 27.8	0 2 18.58	17.780	-0 48 3.1	139.53
16	0 9 16.22	17.745	+0 6 50.2	140.55	16 0 31.0	0 9 25.38	17.783	+0 8 2.7	140.88
17	0 16 21.92	17.726	1 3 16.0	141.53	17 0 34.1	0 16 32.01	17.763	1 4 36.5	141.85
18	0 23 26.86	17.681	2 0 0.3	142.09	18 0 37.3	0 23 37.84	17.717	2 1 29.6	142.40
19	0 30 30.33	17.603	2 56 52.7	142.19	19 0 40.4	0 30 42.18	17.638	2 58 28.4	142.49
20	0 37 31.51	17.488	3 53 41.4	141.78	20 0 43.5	0 37 44.18	17.521	3 55 24.1	142.06
21	0 44 29.44	17.333	4 50 13.8	140.83	21 0 46.5	0 44 42.87	17.363	4 52 2.9	141.08
22	0 51 23.11	17.131	5 46 16.5	139.30	22 0 49.5	0 51 37.22	17.157	5 48 11.3	139.52
23	0 58 11.31	16.878	6 41 35.3	137.16	23 0 52.3	0 58 26.02	16.901	6 43 34.8	137.34
24	1 4 52.82	16.571	7 35 55.5	134.42	24 0 55.1	1 5 8.03	16.589	7 37 58.8	134.56
25	1 11 26.28	16.208	8 29 2.4	131.06	25 0 57.7	1 11 42.87	16.219	8 31 8.4	131.14
26	1 17 50.33	15.787	9 20 41.4	127.09	26 1 0.2	1 18 6.15	15.793	9 22 48.7	127.12
27	1 24 3.56	15.306	10 10 38.3	122.55	27 1 2.4	1 24 19.47	15.307	10 12 45.6	122.50
28	1 30 4.56	14.767	10 58 39.7	117.47	28 1 4.5	1 30 20.40	14.762	11 0 45.7	117.39
29	1 35 51.93	14.172	11 44 32.9	111.88	29 1 6.3	1 36 7.57	14.160	11 46 36.3	111.75
30	1 41 24.34	13.520	12 28 6.5	105.84	30 1 7.8	1 41 39.60	13.502	12 30 5.8	105.65
31	1 46 40.46	12.817	13 9 10.1	99.39	31 1 9.2	1 46 55.20	12.793	13 11 4.3	99.15
Apr. 1	1 51 39.11	12.063	13 47 34.5	92.59	1 1 10.2	1 51 53.19	12.033	13 49 22.5	92.31
2	1 56 19.14	11.265	14 23 11.8	85.47	2 1 11.0	1 56 32.42	11.229	14 24 52.5	85.16
3	2 0 39.52	10.426	14 55 55.2	78.10	3 1 11.3	2 0 51.87	10.384	14 57 27.6	77.76
4	2 4 39.31	9.551	15 25 38.9	70.50	4 1 11.4	2 4 50.62	9.504	15 27 2.4	70.12
5	2 8 17.66	8.641	15 52 17.7	62.71	5 1 11.1	2 8 27.85	8.593	15 53 31.6	62.31
6	2 11 33.86	7.705	16 15 47.5	54.76	6 1 10.4	2 11 42.85	7.654	16 16 51.3	54.33
7	2 14 27.29	6.744	16 36 4.9	46.67	7 1 9.3	2 14 35.03	6.692	16 36 58.4	46.24
8	2 16 57.44	5.766	16 53 6.7	38.47	8 1 7.8	2 17 3.91	5.713	16 53 49.8	38.04
9	2 19 3.96	4.777	17 6 50.5	30.17	9 1 6.0	2 19 9.17	4.725	17 6 23.3	29.74
10	2 20 46.68	3.782	17 17 14.3	21.80	10 1 3.7	2 20 50.65	3.732	17 17 37.1	21.39
11	2 22 5.52	2.789	17 24 16.8	13.40	11 1 1.1	2 22 8.32	2.742	17 24 30.1	13.01
12	2 23 0.62	1.806	17 27 57.8	+ 5.00	12 0 58.1	2 23 2.33	1.763	17 28 2.3	+ 4.65
13	2 23 32.37	+0.843	17 28 17.3	- 3.37	13 0 54.6	2 23 33.11	+0.806	17 28 13.9	- 3.67
14	2 23 41.34	-0.090	17 25 16.9	11.65	14 0 50.9	2 23 41.24	-0.121	17 25 6.8	11.91
15	2 23 28.38	0.983	17 18 59.2	19.78	15 0 46.7	2 23 27.60	1.008	17 18 43.6	19.98
16	2 22 54.55	1.825	17 9 20.0	27.60	16 0 42.2	2 22 53.25	1.845	17 9 9.6	27.82
17	2 22 1.22	2.605	16 56 52.5	35.29	17 0 37.4	2 21 59.62	2.615	16 56 30.4	35.36
18	2 20 50.08	3.312	16 41 18.1	42.49	18 0 32.2	2 20 48.30	3.315	16 40 55.2	42.49
19	2 19 22.96	3.934	16 22 56.9	49.18	19 0 26.9	2 19 21.20	3.930	16 22 34.8	49.11
20	2 17 41.98	4.464	16 2 2.4	55.25	20 0 21.3	2 17 40.40	4.454	16 1 49.8	55.12
21	2 15 49.50	4.892	15 38 50.5	60.61	21 0 15.5	2 15 48.24	4.877	15 38 34.9	60.42
22	2 13 48.04	5.212	15 13 39.7	65.15	22 0 9.5	2 13 47.21	5.193	15 13 29.4	64.91
23	2 11 40.21	5.422	14 46 50.6	68.78	23 0 3.5	2 11 39.90	5.400	14 46 46.6	68.50
24	2 9 28.68	5.520	14 18 45.8	71.45	23 23 57.4	2 9 28.92	5.496	14 18 48.9	71.15
25	2 7 16.12	5.508	13 49 49.0	73.11	24 23 51.2	2 7 16.92	5.484	13 49 59.7	72.79
26	2 5 5.17	5.388	13 20 24.8	73.73	25 23 45.1	2 5 6.50	5.367	13 20 43.1	73.42
27	2 2 58.26	5.170	12 50 57.8	73.35	26 23 39.1	2 3 0.06	5.152	12 51 23.3	73.06
28	2 0 57.73	4.860	12 21 51.9	71.98	27 23 33.2	2 0 50.90	4.846	12 22 24.1	71.72
29	1 59 5.64	4.467	11 53 30.0	69.69	28 23 27.4	1 59 8.07	4.459	11 54 7.9	69.47
30	1 57 23.87	-4.003	+11 26 13.7	-66.54	29 23 21.8	1 57 26.42	4.001	11 26 56.2	66.38
					30 23 16.3	1 55 56.54	-3.482	+11 1 7.6	-62.56

Date. 1872.	FOR WASHINGTON MEAN NOON.				FOR MERIDIAN TRANSIT.				
	Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Mean Time of Transit.	Apparent Right Ascension.	Diff. for 1 h. of Long.	Apparent Declination.	Diff. for 1 hour of Long.
May 1	1 55 53.99	-3.478	+11 0 21.9	-62.66	1 28 11.1	1 54 39.74	-2.912	+10 36 58.8	-58.08
2	1 54 37.35	2.902	10 36 11.3	58.12	2 23 6.2	1 53 37.06	2.301	10 14 44.2	53.06
3	1 53 34.99	2.286	10 13 56.4	53.04	3 23 1.4	1 52 49.39	1.665	9 54 35.5	47.61
4	1 52 47.76	1.644	9 53 48.8	47.53	4 22 57.0	1 52 17.31	1.006	9 36 41.8	41.81
5	1 52 16.25	0.980	9 35 57.7	41.68	5 22 52.8	1 52 1.22	-0.334	9 21 10.1	35.78
6	1 52 0.84	-0.304	9 20 29.9	35.60	6 22 48.8	1 52 1.32	+0.344	9 8 5.2	29.50
7	1 52 1.73	+0.378	9 7 30.0	29.37	7 22 45.2	1 52 17.71	1.023	8 57 29.7	23.33
8	1 52 18.99	1.060	8 57 0.5	23.07	8 22 41.8	1 52 50.34	1.696	8 49 24.9	17.07
9	1 52 52.56	1.736	8 49 2.5	16.77	9 22 38.7	1 53 39.04	2.360	8 43 50.1	10.84
10	1 53 42.24	2.403	8 43 35.3	10.51	10 22 35.8	1 54 43.56	3.014	8 40 43.9	- 4.70
11	1 54 47.80	3.058	8 40 37.3	- 4.35	11 22 33.2	1 56 3.64	3.656	8 40 7.4	+ 1.32
12	1 56 8.94	3.700	8 40 5.5	+ 1.68	12 22 30.9	1 57 38.93	4.282	8 41 46.0	7.19
13	1 57 45.30	4.327	8 41 56.7	7.55	13 22 28.8	1 59 29.08	4.894	8 45 47.0	12.87
14	1 59 36.53	4.939	8 46 6.5	13.24	14 22 26.9	2 1 33.72	5.490	8 52 1.9	18.35
15	2 1 42.25	5.535	8 52 30.4	18.72	15 22 25.3	2 3 52.47	6.071	9 0 26.0	23.61
16	2 4 2.07	6.115	9 1 3.3	23.98	16 22 23.9	2 6 25.00	6.637	9 10 54.1	28.67
17	2 6 35.64	6.680	9 11 40.0	29.03	17 22 22.7	2 9 10.94	7.189	9 23 20.8	33.52
18	2 9 22.61	7.231	9 24 15.2	33.86	18 22 21.7	2 12 9.96	7.729	9 37 41.0	38.13
19	2 12 23.63	7.769	9 38 43.5	38.46	19 22 21.0	2 15 21.79	8.255	9 53 49.1	42.51
20	2 15 35.42	8.295	9 54 59.3	42.82	20 22 20.6	2 18 46.14	8.772	10 11 39.6	46.67
21	2 19 0.70	8.810	10 12 57.1	46.96	21 22 20.2	2 22 22.79	9.280	10 31 7.3	50.60
22	2 22 38.23	9.316	10 32 31.5	50.87	22 22 20.0	2 26 11.52	9.780	10 52 6.4	54.30
23	2 26 27.82	9.815	10 53 36.9	54.55	23 22 20.1	2 30 12.20	10.274	11 14 31.7	57.78
24	2 30 29.30	10.307	11 16 7.9	58.00	24 22 20.3	2 34 24.66	10.764	11 38 17.8	61.03
25	2 34 42.54	10.795	11 39 59.2	61.23	25 22 20.8	2 38 48.84	11.252	12 3 19.3	64.07
26	2 39 7.45	11.281	12 5 5.3	64.24	26 22 21.5	2 43 24.70	11.737	12 29 31.0	66.88
27	2 43 44.00	11.765	12 31 20.8	67.02	27 22 22.3	2 48 12.26	12.223	12 56 47.3	69.45
28	2 48 32.15	12.248	12 58 40.3	69.57	28 22 23.4	2 53 11.47	12.711	13 25 2.7	71.83
29	2 53 31.94	12.734	13 26 58.3	71.89	29 22 24.6	2 58 22.43	13.202	13 54 11.7	73.91
30	2 58 43.41	13.222	13 56 9.2	73.97	30 22 26.0	3 3 45.20	13.697	14 24 8.4	75.79
31	3 4 6.64	13.715	14 26 7.1	75.82	31 22 27.7	3 9 19.93	14.198	14 54 47.3	77.41
June 1	3 9 41.76	14.213	14 56 46.4	77.41	1 22 29.5	3 15 6.74	14.705	15 26 2.1	78.78
2	3 15 28.90	14.717	15 28 0.8	78.75	2 22 31.5	3 21 5.82	15.219	15 57 46.5	79.86
3	3 21 28.23	15.228	15 59 44.2	79.82	3 22 33.7	3 27 17.33	15.742	16 29 54.0	80.63
4	3 27 39.93	15.748	16 31 49.8	80.60	4 22 36.2	3 33 41.49	16.274	17 2 17.2	81.19
5	3 34 4.19	16.276	17 4 10.4	81.07	5 22 38.8	3 40 18.53	16.813	17 34 48.9	81.39
6	3 40 41.23	16.811	17 36 38.7	81.23	6 22 41.8	3 47 8.59	17.360	18 7 21.1	81.23
7	3 47 31.19	17.354	18 9 6.8	81.05	7 22 44.9	3 54 11.87	17.915	18 39 45.3	80.73
8	3 54 34.27	17.904	18 41 26.2	80.51	8 22 48.2	4 1 28.53	18.473	19 12 52.8	79.82
9	4 1 50.59	18.457	19 13 28.0	79.57	9 22 51.7	4 8 58.61	19.035	19 43 33.4	78.50
10	4 9 20.22	19.013	19 45 2.4	78.23	10 22 55.5	4 16 42.20	19.596	20 14 37.2	76.74
11	4 17 3.21	19.568	20 15 59.4	76.45	11 22 59.5	4 24 30.20	20.152	20 44 53.3	74.52
12	4 24 59.45	20.118	20 46 8.1	74.20	12 23 3.7	4 32 49.42	20.696	21 14 10.2	71.81
13	4 33 8.78	20.656	21 15 17.3	71.48	13 23 8.2	4 41 12.60	21.229	21 42 16.1	68.59
14	4 41 30.89	21.182	21 43 15.1	68.25	14 23 12.8	4 49 48.27	21.739	22 8 58.6	64.86
15	4 50 5.33	21.684	22 9 49.4	64.52	15 23 17.6	4 58 35.83	22.218	22 34 5.5	60.61
16	4 58 51.47	22.156	22 34 48.1	60.28	16 23 22.7	5 7 34.46	22.661	22 57 24.2	55.86
17	5 7 48.52	22.592	22 57 58.8	55.53	17 23 27.9	5 16 43.20	23.059	23 18 43.0	50.61
18	5 16 55.51	22.983	23 19 9.9	50.31	18 23 33.2	5 26 0.86	23.404	23 37 50.2	44.91
19	5 26 11.29	23.323	23 38 10.2	44.64	19 23 38.6	5 35 26.14	23.691	23 54 35.5	38.78
20	5 35 34.54	23.605	23 54 49.2	38.55	20 23 44.2	5 44 57.54	23.913	24 8 49.5	32.33
21	5 45 3.81	23.823	24 8 58.0	32.13	21 23 49.8	5 54 33.45	24.067	24 20 24.8	25.57
22	5 54 37.51	23.974	24 20 29.1	25.42	22 23 55.5	6 4 12.21	24.151	24 29 15.1	18.50
23	6 4 14.01	24.056	24 29 16.5	18.50					
24	6 13 51.62	24.067	24 35 16.3	11.44	24 0 1.2	6 13 52.12	24.162	24 35 16.5	11.48
25	6 23 28.67	24.010	24 38 26.4	+ 4.38	25 0 6.9	6 23 31.45	24.105	24 38 26.9	+ 4.36
26	6 33 3.57	23.888	24 38 46.6	- 2.68	26 0 12.6	6 33 8.59	23.980	24 38 46.0	- 2.75
27	6 42 34.79	23.703	24 36 18.5	9.64	27 0 18.2	6 42 41.98	23.791	24 36 15.6	9.76
28	6 52 0.89	23.463	24 31 5.2	16.43	28 0 23.7	6 52 10.16	23.548	24 30 58.7	16.60
29	7 1 20.64	23.175	24 23 11.4	23.01	29 0 29.2	7 1 31.90	23.254	24 23 6.2	23.23
30	7 10 32.89	22.841	24 12 42.8	20.32	30 0 34.4	7 10 45.99	22.915	24 12 26.0	29.57
31	7 19 36.71	22.472	+23 59 46.2	-35.34	31 0 39.5	7 19 51.51	22.540	+23 59 22.9	-35.62

FOR WASHINGTON MEAN NOON.					FOR MERIDIAN TRANSIT.				
Date.	Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Mean Time of Transit.	Apparent Right Ascension.	Diff. for 1 h. of Long.	Apparent Declination.	Diff. for 1 hour of Long.
1872.									
July 1	7 19 36.71	22.472	+23 59 46.2	-35.34	1 0 39.5	7 19 51.51	22.540	+23 59 22.9	-35.62
2	7 28 31.28	22.072	23 44 28.9	41.04	2 0 44.5	7 28 47.64	22.135	23 43 58.4	41.35
3	7 37 15.95	21.648	23 26 58.9	46.40	3 0 49.3	7 37 33.73	21.704	23 26 20.7	46.73
4	7 45 50.22	21.205	23 7 24.4	51.41	4 0 54.0	7 46 9.28	21.255	23 6 38.1	51.76
5	7 54 13.68	20.748	22 45 53.9	56.07	5 0 58.4	7 54 33.86	20.792	22 44 59.2	56.42
6	8 2 26.05	20.282	22 22 35.5	60.40	6 1 2.7	8 2 47.22	20.321	22 21 32.3	60.76
7	8 10 27.17	19.810	21 57 37.5	64.38	7 1 6.7	8 10 49.19	19.842	21 56 25.8	64.74
8	8 18 16.92	19.335	21 31 8.0	68.03	8 1 10.7	8 18 39.66	19.362	21 29 47.8	68.39
9	8 25 55.27	18.860	21 3 14.8	71.35	9 1 14.3	8 26 18.60	18.882	21 1 46.2	71.69
10	8 33 22.23	18.387	20 34 5.5	74.37	10 1 17.8	8 33 46.04	18.405	20 32 28.8	74.70
11	8 40 37.90	17.918	20 3 47.5	77.09	11 1 21.1	8 41 2.09	17.932	20 2 3.1	77.41
12	8 47 42.34	17.453	19 32 27.5	79.53	12 1 24.3	8 48 6.82	17.463	19 30 35.6	79.83
13	8 54 35.69	16.993	19 0 12.2	81.70	13 1 27.2	8 55 0.35	16.999	18 58 13.3	81.98
14	9 1 18.07	16.540	18 27 7.9	83.62	14 1 30.0	9 1 42.83	16.543	18 25 2.4	83.88
15	9 7 49.66	16.093	17 53 20.7	85.28	15 1 32.6	9 8 14.44	16.092	17 51 9.1	85.52
16	9 14 10.58	15.652	17 18 56.4	86.71	16 1 35.0	9 14 35.31	15.646	17 16 39.1	86.94
17	9 20 20.98	15.216	16 44 0.5	87.92	17 1 37.2	9 20 45.58	15.209	16 41 38.0	88.12
18	9 26 21.01	14.787	16 8 38.2	88.91	18 1 39.2	9 26 45.41	14.778	16 6 11.1	89.09
19	9 32 10.81	14.363	15 32 54.7	89.69	19 1 41.1	9 32 34.96	14.352	15 30 23.6	89.85
20	9 37 50.48	13.943	14 56 54.9	90.27	20 1 42.8	9 38 14.32	13.929	14 54 20.2	90.40
21	9 43 20.12	13.528	14 20 43.6	90.65	21 1 44.3	9 43 43.59	13.512	14 18 6.0	90.76
22	9 48 39.84	13.115	13 44 25.4	90.84	22 1 45.7	9 49 2.90	13.097	13 41 45.3	90.93
23	9 53 49.67	12.704	13 8 4.7	90.85	23 1 47.0	9 54 12.26	12.683	13 5 22.8	90.91
24	9 58 49.66	12.295	12 31 46.2	90.67	24 1 48.0	9 59 11.73	12.273	12 29 3.1	90.71
25	10 3 39.84	11.886	11 55 34.2	90.31	25 1 48.9	10 4 1.35	11.862	11 52 50.4	90.33
26	10 8 23.17	11.475	11 19 33.0	89.76	26 1 49.6	10 8 41.07	11.449	11 16 49.1	89.75
27	10 12 50.61	11.061	10 43 47.1	89.04	27 1 50.1	10 13 10.86	11.033	10 41 3.8	89.01
28	10 17 11.08	10.644	10 8 20.8	88.12	28 1 50.5	10 17 30.63	10.614	10 3 38.6	88.06
29	10 21 21.46	10.221	9 33 18.7	87.02	29 1 50.8	10 21 40.28	10.189	9 30 38.3	86.94
30	10 25 21.61	9.791	8 58 45.5	85.72	30 1 50.8	10 25 39.64	9.757	8 56 7.4	85.61
Aug. 1	10 29 11.35	9.352	8 24 45.8	84.22	31 1 50.7	10 29 28.54	9.316	8 22 10.7	84.08
2	10 32 50.43	8.903	7 51 24.6	82.51	1 1 50.4	10 33 6.74	8.866	7 48 53.1	82.35
3	10 36 18.61	8.442	7 18 47.0	80.59	2 1 49.9	10 36 34.01	8.404	7 16 19.6	80.40
4	10 39 35.54	7.967	6 46 58.2	78.44	3 1 49.2	10 39 49.98	7.927	6 44 35.7	78.24
5	10 42 40.90	7.477	6 16 4.0	76.04	4 1 48.4	10 42 54.33	7.435	6 13 47.0	75.80
6	10 45 34.27	6.968	5 46 10.2	73.40	5 1 47.3	10 45 46.66	6.925	5 43 59.3	73.13
7	10 48 15.21	6.440	5 17 23.2	70.48	6 1 46.0	10 48 26.52	6.395	5 15 19.1	70.19
8	10 50 43.20	5.890	4 49 40.6	67.27	7 1 44.5	10 50 53.39	5.844	4 47 52.8	66.95
9	10 52 57.74	5.317	4 23 36.4	63.77	8 1 42.8	10 53 6.78	5.269	4 21 47.6	63.43
10	10 54 58.23	4.720	3 58 51.2	59.94	9 1 40.9	10 55 6.09	4.671	3 57 10.9	59.58
11	10 56 44.07	4.096	3 35 41.8	55.78	10 1 38.7	10 56 50.74	4.047	3 34 10.5	55.39
12	10 58 14.61	3.444	3 14 16.8	51.24	11 1 36.2	10 58 20.08	3.394	3 12 55.1	50.83
13	10 59 29.17	2.764	2 54 45.1	46.33	12 1 33.5	10 59 33.42	2.714	2 53 33.4	45.91
14	11 0 27.05	2.055	2 37 16.0	41.02	13 1 30.5	11 0 30.09	2.006	2 36 14.6	40.59
15	11 1 7.60	1.319	2 21 59.3	35.30	14 1 27.2	11 1 9.46	1.271	2 21 8.5	34.86
16	11 1 30.14	+0.555	2 9 5.2	29.14	15 1 23.6	11 1 30.86	+0.509	2 8 25.0	28.70
17	11 1 34.07	-0.232	1 58 43.8	22.57	16 1 19.8	11 1 33.70	-0.275	1 58 14.2	22.13
18	11 1 18.87	1.039	1 51 5.3	15.57	17 1 15.6	11 1 17.51	1.078	1 50 46.7	15.15
19	11 0 44.11	1.863	1 46 19.9	8.15	18 1 11.0	11 0 41.87	1.895	1 46 10.7	- 7.75
20	10 59 49.54	2.638	1 44 37.0	- 0.35	19 1 6.2	10 59 46.53	2.717	1 44 37.0	+ 0.01
21	10 58 35.11	3.513	1 46 5.1	+ 7.76	20 1 1.0	10 58 31.50	3.534	1 46 13.6	8.08
22	10 57 1.02	4.324	1 50 51.3	16.13	21 0 55.5	10 56 56.98	4.338	1 51 6.5	16.39
23	10 55 7.81	5.105	1 59 0.8	24.68	22 0 49.7	10 55 3.56	5.110	1 59 21.4	24.88
24	10 52 56.36	5.840	2 10 36.2	33.26	23 0 43.6	10 52 52.10	5.836	2 11 0.5	33.37
25	10 50 28.00	6.511	2 25 36.6	41.74	24 0 37.2	10 50 23.95	6.498	2 26 2.6	41.77
26	10 47 44.50	7.098	2 43 57.4	49.94	25 0 30.5	10 47 40.89	7.076	2 44 23.0	49.88
27	10 44 48.16	7.578	3 5 29.7	57.66	26 0 23.7	10 44 45.17	7.549	3 5 52.5	57.51
28	10 41 41.76	7.933	3 29 59.5	64.70	27 0 16.7	10 41 39.56	7.898	3 30 17.5	64.46
29	10 38 28.55	8.142	3 57 8.2	70.86	28 0 9.5	10 38 27.26	8.103	3 57 19.4	70.55
30	10 35 12.24	8.189	4 26 31.9	75.92	29 0 2.3	10 35 11.92	8.148	4 26 34.9	75.56
31	10 31 56.85	8.663	4 57 42.2	79.72	29 23 55.2	10 31 57.50	8.023	4 57 35.8	79.32
	10 28 46.67	-7.754	+5 30 7.2	+32.12	30 23 48.1	10 27 48.21	7.720	5 29 50.9	81.71
					31 23 41.2	10 25 48.39	-7.236	+ 6 2 45.8	+32.63

Date. 1872.	FOR WASHINGTON MEAN NOON.				FOR MERIDIAN TRANSIT.				
	Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Mean Time of Transit.	Apparent Right Ascension.	Diff. for 1 h. of Long.	Apparent Declination.	Diff. for 1 hour of Long.
Sept. 1	<sup>h</sup> 10 <sup>m</sup> 25 <sup>s</sup> 46.11	-7.262	+ 6 3 11.8	+83.02	<sup>d</sup> 1 <sup>h</sup> 23 <sup>m</sup> 34.5	<sup>h</sup> 10 <sup>m</sup> 23 <sup>s</sup> 2.33	-6.574	+ 6 35 44.8	+82.04
2	10 22 59.53	6.590	6 36 19.8	82.38	2 23 28.1	10 20 34.19	5.746	7 8 11.2	79.92
3	10 23 31.12	5.750	7 8 53.8	80.23	3 23 22.1	10 18 27.79	4.763	7 39 29.4	76.36
4	10 18 24.77	4.754	7 40 17.9	76.56	4 23 16.5	10 16 46.63	3.647	8 9 5.8	71.46
5	10 16 43.98	3.625	8 9 57.9	71.55	5 23 11.3	10 15 33.60	2.420	8 37 29.5	65.31
6	10 15 31.64	2.386	8 37 22.6	65.33	6 23 6.7	10 14 51.13	-1.106	9 1 12.0	58.07
7	10 14 50.15	-1.060	9 2 3.7	57.96	7 23 2.6	10 14 41.01	+9.269	9 22 49.4	49.91
8	10 14 41.24	+9.325	9 23 37.3	49.70	8 22 59.0	10 15 4.38	1.682	9 41 1.7	41.00
9	10 15 6.03	1.745	9 41 43.4	49.70	9 22 56.1	10 16 1.78	3.104	9 55 32.5	31.48
10	10 16 5.05	3.173	9 56 6.1	31.11	10 22 53.6	10 17 33.20	4.515	10 6 9.4	21.52
11	10 17 38.21	4.586	10 6 33.2	21.09	11 22 51.8	10 19 38.16	5.893	10 12 43.7	11.29
12	10 19 44.88	5.963	10 12 56.4	10.82	12 22 50.5	10 22 15.61	7.219	10 15 10.4	+ 0.91
13	10 22 23.99	7.280	10 15 11.4	+ 0.42	13 22 49.7	10 25 24.06	8.474	10 13 27.8	- 9.46
14	10 25 34.00	8.536	10 13 16.6	- 9.96	14 22 49.4	10 29 1.61	9.648	10 17 37.6	19.71
15	20 29 13.06	9.733	10 7 14.3	20.23	15 22 49.5	10 33 6.40	10.729	9 57 44.0	29.72
16	10 33 19.01	10.776	9 57 9.0	30.18	16 22 50.0	10 37 35.86	11.709	9 43 54.4	39.36
17	10 37 49.51	11.748	9 43 8.5	30.79	17 22 51.0	10 42 27.63	12.585	9 26 18.4	48.56
18	10 42 42.07	12.615	9 25 22.5	48.95	18 22 52.2	10 47 30.09	13.354	9 5 7.6	57.24
19	10 47 54.16	13.375	9 4 3.0	57.58	19 22 53.7	10 53 7.77	14.019	8 40 35.6	65.32
20	10 53 23.23	14.031	8 39 23.6	65.63	20 22 55.5	10 58 51.18	14.583	8 12 57.4	72.76
21	10 59 6.83	14.587	8 11 30.3	72.98	21 22 57.5	11 4 46.97	15.050	7 42 28.4	79.55
22	11 5 2.62	15.047	7 41 5.6	79.71	22 22 59.6	11 10 52.90	15.430	7 9 24.7	85.64
23	11 11 8.39	15.421	7 7 58.7	85.75	23 23 1.9	11 17 6.98	15.731	6 34 2.9	91.06
24	11 17 22.18	15.716	6 32 34.9	91.12	24 23 4.3	11 23 27.40	15.959	5 56 38.8	95.83
25	11 23 42.18	15.940	5 55 10.0	95.84	25 23 6.8	11 29 52.54	16.126	5 17 28.1	99.95
26	11 30 6.82	16.104	5 15 59.6	99.92	26 23 9.3	11 36 21.06	16.240	4 36 45.5	103.49
27	11 36 34.76	16.215	4 35 18.3	103.42	27 23 11.8	11 42 51.73	16.309	3 54 45.2	106.46
28	11 43 4.79	16.282	3 53 19.9	106.36	28 23 14.5	11 49 23.61	16.341	3 11 39.8	108.90
29	11 49 35.99	16.312	3 10 17.3	108.78	29 23 17.1	11 55 55.86	16.341	2 27 41.4	110.88
30	11 56 7.53	16.312	2 26 22.2	110.74	30 23 19.6	12 2 27.82	16.319	1 43 0.8	112.43
Oct. 1	12 2 38.78	16.289	1 41 45.3	112.27	1 23 22.2	12 8 59.01	16.276	0 57 47.7	113.59
2	12 9 9.24	16.246	0 56 36.3	113.42	2 23 24.8	12 15 28.99	16.220	+ 0 12 11.2	114.41
3	12 15 38.59	16.190	+ 0 11 4.1	114.22	3 23 27.3	12 21 57.49	16.154	- 0 33 41.1	114.90
4	12 22 6.23	16.124	- 0 34 43.6	114.71	4 23 29.8	12 28 24.32	16.080	1 19 41.9	115.12
5	12 28 32.39	16.051	1 20 30.7	114.92	5 23 32.3	12 34 49.31	16.002	2 5 44.7	115.09
6	12 34 56.69	15.974	2 6 37.8	114.89	6 23 34.7	12 41 12.43	15.923	2 51 44.3	114.84
7	12 41 19.13	15.895	2 52 32.6	114.64	7 23 37.1	12 47 33.63	15.843	3 37 35.4	114.40
8	12 47 39.67	15.816	3 38 19.6	114.23	8 23 39.5	12 53 52.93	15.766	4 23 14.0	113.78
9	12 53 58.33	15.739	4 23 52.8	113.58	9 23 41.8	13 0 10.42	15.691	5 8 35.6	113.00
10	13 0 15.17	15.665	5 9 9.8	112.81	10 23 44.1	13 6 26.14	15.620	5 53 37.0	112.09
11	13 6 33.27	15.584	5 54 6.6	111.90	11 23 46.4	13 12 49.21	15.553	6 38 15.1	111.06
12	13 12 43.73	15.528	6 38 40.2	110.87	12 23 48.7	13 18 52.74	15.491	7 22 27.0	109.91
13	13 18 55.66	15.467	7 22 47.7	109.73	13 23 50.9	13 25 3.84	15.435	8 6 10.1	108.67
14	13 25 6.18	15.411	8 6 26.6	108.49	14 23 53.1	13 31 13.67	15.384	8 49 22.3	107.33
15	13 31 15.43	15.361	8 49 34.6	107.16	15 23 55.3	13 37 22.35	15.340	9 32 1.3	105.91
16	13 37 23.55	15.317	9 32 9.6	105.75	16 23 57.5	13 43 30.04	15.301	10 14 5.4	104.42
17	13 43 30.68	15.278	10 14 9.8	104.26	17 23 59.6	13 49 36.86	15.268	10 55 32.9	102.85
18	13 49 36.95	15.245	10 55 33.5	102.70					
19	13 55 42.52	15.219	11 36 18.8	101.07	19 0 1.8	13 55 42.98	15.242	11 36 21.8	101.22
20	14 1 47.51	15.198	12 16 24.3	99.38	20 0 4.0	14 1 48.51	15.220	12 16 30.8	99.52
21	14 7 52.07	15.183	12 55 48.8	97.64	21 0 6.1	14 7 53.61	15.205	12 55 58.7	97.78
22	14 13 56.33	15.173	13 34 30.6	95.83	22 0 8.2	14 13 58.41	15.195	13 34 43.7	95.96
23	14 20 0.41	15.168	14 12 28.3	93.97	23 0 10.3	14 20 3.03	15.190	14 12 44.5	94.09
24	14 26 4.43	15.163	14 49 40.8	92.06	24 0 12.5	14 26 7.58	15.190	14 49 59.9	92.18
25	14 32 8.49	15.172	15 26 6.9	90.10	25 0 14.6	14 32 12.18	15.195	15 26 28.8	90.21
26	14 38 12.71	15.180	16 1 45.2	88.08	26 0 16.7	14 38 16.95	15.203	16 2 9.7	88.18
27	14 44 17.17	15.192	16 36 34.4	86.01	27 0 18.9	14 44 21.95	15.215	16 37 1.4	86.11
28	14 50 21.97	15.208	17 10 33.3	83.89	28 0 21.0	14 50 27.29	15.231	17 11 2.7	83.98
29	14 56 27.17	15.226	17 43 40.7	81.72	29 0 23.2	14 56 33.04	15.249	17 44 12.2	81.81
30	15 2 32.82	15.246	18 15 55.2	79.49	30 0 25.3	15 2 39.25	15.269	18 16 28.7	79.57
31	15 8 38.98	15.268	18 47 15.7	77.21	31 0 27.5	15 8 45.97	15.291	18 47 51.1	77.28
32	15 14 45.70	15.292	19 17 40.7	74.87	32 0 29.6	15 14 53.25	15.316	19 18 17.7	74.93

		FOR WASHINGTON MEAN NOON.					FOR MERIDIAN TRANSIT.				
Date.	Appa ent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Mean Time of Transit.	Apparent Right Ascension.	Diff. for 1 h. of Long.	Apparent Declination.	Diff. for 1 hour of Long.		
1872.	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>"</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>	<sup>d</sup> <sup>h</sup> <sup>m</sup>	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>"</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>		
Nov. 1	15 14 45.70	15.292	19 17 40.7	-74.87	1 0 29.6	15 14 53.25	15.316	19 18 17.7	-74.93		
2	15 20 52.98	15.315	19 47 9.1	72.48	2 0 31.8	15 21 1.10	15.339	19 47 47.5	72.54		
3	15 27 0.81	15.338	20 15 39.3	70.03	3 0 34.0	15 27 9.51	15.362	20 16 19.0	70.08		
4	15 33 9.18	15.360	20 43 10.0	67.52	4 0 36.2	15 33 18.45	15.384	20 43 50.7	67.56		
5	15 39 18.06	15.380	21 9 40.0	64.96	5 0 38.4	15 39 27.91	15.404	21 10 21.6	64.99		
6	15 45 27.39	15.397	21 35 7.6	62.33	6 0 40.7	15 45 37.83	15.421	21 35 49.8	62.35		
7	15 51 37.09	15.411	21 59 31.4	59.64	7 0 42.9	15 51 48.10	15.435	22 0 14.0	59.65		
8	15 57 47.06	15.419	22 22 49.9	56.89	8 0 45.1	15 57 58.65	15.443	22 23 32.6	56.89		
9	16 3 57.15	15.421	22 45 1.7	54.08	9 0 47.3	16 4 9.31	15.445	22 45 44.3	54.07		
10	16 10 7.19	15.415	23 6 5.2	51.20	10 0 49.5	16 10 19.92	15.438	23 6 47.4	51.18		
11	16 16 16.99	15.400	23 25 59.0	48.27	11 0 51.8	16 16 30.27	15.423	23 26 40.6	48.24		
12	16 22 26.29	15.374	23 44 41.4	45.26	12 0 54.0	16 22 40.12	15.396	23 45 22.0	45.21		
13	16 28 34.82	15.335	24 2 10.8	42.18	13 0 56.2	16 28 49.18	15.356	24 2 50.2	42.12		
14	16 34 42.24	15.289	24 18 25.7	39.05	14 0 58.4	16 34 57.10	15.300	24 19 3.6	38.98		
15	16 40 48.14	15.238	24 33 24.6	35.85	15 1 0.5	16 41 3.48	15.227	24 34 0.7	35.77		
16	16 46 52.08	15.116	24 47 5.9	32.58	16 1 2.7	16 47 7.87	15.133	24 47 39.7	32.48		
17	16 52 53.53	15.000	24 59 28.2	29.26	17 1 4.7	16 53 9.71	15.015	24 59 59.6	29.15		
18	16 58 51.88	14.857	25 10 30.0	25.88	18 1 6.8	16 59 8.41	14.870	25 10 58.6	25.76		
19	17 4 46.43	14.684	25 20 10.0	22.44	19 1 8.7	17 5 3.25	14.694	25 20 35.5	22.31		
20	17 10 36.43	14.476	25 28 26.7	18.95	20 1 10.6	17 10 53.46	14.483	25 28 48.8	18.80		
21	17 16 20.93	14.226	25 35 19.1	15.41	21 1 12.4	17 16 38.08	14.229	25 35 37.5	15.25		
22	17 21 58.90	13.930	25 40 46.2	11.84	22 1 14.1	17 22 16.08	13.929	25 41 0.6	11.67		
23	17 27 29.16	13.583	25 44 47.0	8.22	23 1 15.7	17 27 46.27	13.577	25 44 57.1	8.04		
24	17 32 50.39	13.175	25 47 20.7	4.50	24 1 17.1	17 33 7.28	13.165	25 47 26.4	4.39		
25	17 38 1.03	12.700	25 48 27.1	-0.94	25 1 18.3	17 38 17.56	12.682	25 48 28.1	-0.74		
26	17 42 59.40	12.150	25 48 5.8	+2.72	26 1 19.3	17 43 15.42	12.125	25 48 2.0	+2.92		
27	17 47 43.52	11.513	25 46 16.9	6.36	27 1 20.1	17 47 58.84	11.480	25 46 8.2	6.57		
28	17 52 11.24	10.789	25 43 0.9	9.97	28 1 20.6	17 52 25.67	10.738	25 42 47.3	10.18		
29	17 56 20.09	9.940	25 38 18.5	13.55	29 1 20.8	17 56 33.41	9.890	25 38 0.0	13.75		
30	18 0 7.39	8.981	25 32 10.8	17.07	30 1 20.6	18 0 19.39	8.922	25 31 47.6	17.26		
Dec. 1	18 3 30.15	7.893	25 24 39.5	20.53	1 1 20.0	18 3 40.61	7.824	25 24 11.9	20.71		
2	18 6 25.13	6.665	25 15 46.1	23.90	2 1 19.0	18 6 33.82	6.588	25 15 14.4	24.06		
3	18 8 48.88	5.289	25 5 32.9	27.18	3 1 17.4	18 8 55.61	5.205	25 4 57.6	27.32		
4	18 10 37.78	3.763	24 54 2.1	30.36	4 1 15.2	18 10 42.40	3.671	24 53 23.8	30.47		
5	18 11 48.15	2.079	24 41 16.3	33.44	5 1 12.4	18 11 50.57	1.987	24 40 35.7	33.52		
6	18 12 16.43	+0.255	24 27 18.0	36.41	6 1 8.9	18 12 16.63	+0.165	24 26 36.0	36.45		
7	18 11 59.40	-1.603	24 12 9.7	39.26	7 1 4.7	18 11 57.49	-1.773	24 11 27.2	39.26		
8	18 10 54.45	3.732	23 55 54.3	42.01	8 0 59.6	18 10 50.66	3.802	23 55 12.4	41.96		
9	18 8 59.98	5.810	23 38 34.5	44.61	9 0 53.8	18 8 54.71	5.861	23 37 54.4	44.51		
10	18 6 15.79	7.862	23 20 14.5	47.03	10 0 47.1	18 6 9.56	7.888	23 19 37.4	46.88		
11	18 2 43.50	9.294	23 0 59.3	49.17	11 0 39.6	18 2 36.98	9.891	23 0 26.7	48.96		
12	17 58 26.82	11.543	22 40 57.4	50.91	12 0 31.5	17 58 20.74	11.510	22 40 30.6	50.64		
13	17 53 31.83	12.989	22 20 29.4	52.06	13 0 22.6	17 53 26.91	12.919	22 20 0.8	51.74		
14	17 48 6.89	14.026	21 59 24.9	52.40	14 0 13.3	17 48 3.75	13.943	21 59 13.3	52.06		
15	17 42 22.22	14.614	21 38 33.1	51.72	15 0 3.7	17 42 21.31	14.518	21 38 29.9	51.38		
16	17 36 20.30	14.710	21 18 11.5	49.86	15 23 54.0	17 36 30.77	14.613	21 18 16.5	49.53		
17	17 30 40.03	14.315	20 58 50.0	46.72	16 23 44.3	17 30 43.79	14.228	20 59 2.3	46.45		
18	17 25 5.76	13.470	20 40 59.1	42.32	17 23 34.8	17 25 11.42	13.403	20 41 16.9	42.13		
19	17 19 56.49	12.244	20 25 7.4	36.82	18 23 25.7	17 20 3.49	12.292	20 25 28.5	36.74		
20	17 15 20.41	10.723	20 11 38.6	30.46	19 23 17.2	17 15 28.07	10.710	20 12 0.6	33.46		
21	17 11 23.40	9.092	20 0 49.9	23.54	20 23 9.4	17 11 31.03	9.017	20 1 10.1	23.66		
22	17 8 9.21	7.169	19 52 50.7	16.38	21 23 2.2	17 8 16.16	7.208	19 53 6.7	16.59		
23	17 5 30.61	5.209	19 47 43.4	9.27	22 22 55.7	17 6 45.33	5.359	19 47 53.6	9.53		
24	17 3 54.70	3.453	19 45 23.5	+2.46	23 22 50.0	17 3 58.79	3.527	19 45 26.7	+2.77		
25	17 2 53.35	-1.675	19 45 41.6	-3.86	24 22 45.1	17 2 55.52	1.758	19 45 37.1	-3.53		
26	17 2 33.55	+0.006	19 48 24.1	9.57	25 22 40.8	17 2 33.64	-0.082	19 48 11.8	9.24		
27	17 2 52.73	1.572	19 53 15.6	14.59	26 22 37.1	17 2 50.67	+1.483	19 52 55.8	14.28		
28	17 3 48.00	3.014	19 59 58.9	18.90	27 22 34.1	17 3 43.80	2.926	19 59 32.2	18.61		
29	17 5 16.39	4.332	20 8 17.0	22.49	28 22 31.6	17 5 10.11	4.248	20 7 44.2	22.26		
30	17 7 14.57	5.530	20 17 52.9	25.39	29 22 29.6	17 7 6.73	5.452	20 17 15.0	25.21		
31	17 9 40.91	+6.613	20 28 30.6	-27.65	30 22 28.0	17 9 30.87	6.541	20 27 48.7	27.51		
					31 22 26.9	17 12 19.90	+7.528	20 39 9.9	-29.18		

Date. 1872.	FOR WASHINGTON MEAN NOON.				FOR MERIDIAN TRANSIT.					
	Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Mean Time of Transit.	Apparent Right Ascension.	Diff. for 1 h. of Long.	Apparent Declination.	Diff. for 1 hour of Long.	
Jan. 0	<sup>h</sup> <sup>m</sup> <sup>s</sup> 15 31 11.38	11.415	<sup>°</sup> <sup>'</sup> <sup>"</sup> -16 10 38.7	-42.89	<sup>d</sup> <sup>h</sup> <sup>m</sup> 0 20 53.0	<sup>h</sup> <sup>m</sup> <sup>s</sup> 15 35 10.32	11.474	<sup>°</sup> <sup>'</sup> <sup>"</sup> -16 25 28.3	-42.31	
1	15 35 46.07	11.477	16 27 39.8	42.19	1 20 53.7	15 39 46.45	11.537	16 42 15.1	41.58	
2	15 40 22.28	11.540	16 44 23.9	41.47	2 20 54.4	15 44 24.09	11.599	16 58 44.1	40.82	
3	15 44 59.97	11.601	17 0 50.1	40.70	3 20 55.1	15 49 3.20	11.660	17 14 54.5	40.03	
4	15 49 39.14	11.662	17 16 57.6	39.90	4 20 55.8	15 53 43.77	11.720	17 30 45.4	39.20	
5	15 54 19.75	11.722	17 32 45.5	39.07	5 20 56.5	15 58 25.78	11.780	17 46 15.9	38.33	
6	15 59 1.80	11.781	17 48 12.8	38.19	6 20 57.3	16 3 9.22	11.839	18 1 25.1	37.42	
7	16 3 45.26	11.840	18 3 18.7	37.28	7 20 58.1	16 7 54.05	11.897	18 16 12.1	36.48	
8	16 8 30.10	11.897	18 18 2.4	36.34	8 20 59.0	16 12 40.25	11.953	18 30 36.2	35.51	
9	16 13 16.31	11.953	18 32 23.1	35.37	9 20 59.8	16 17 27.81	12.009	18 44 36.6	34.50	
10	16 18 3.87	12.009	18 46 20.0	34.36	10 21 0.7	16 22 16.68	12.064	18 58 12.4	33.47	
11	16 22 52.73	12.063	18 59 52.2	33.32	11 21 1.6	16 27 6.87	12.117	19 11 23.0	32.40	
12	16 27 42.89	12.116	19 12 59.1	32.24	12 21 2.5	16 31 58.31	12.170	19 24 7.5	31.30	
13	16 32 34.31	12.168	19 25 39.9	31.14	13 21 3.4	16 36 51.01	12.221	19 36 25.3	30.17	
14	16 37 26.96	12.219	19 37 53.8	30.01	14 21 4.4	16 41 44.92	12.271	19 48 15.6	29.01	
15	16 42 20.82	12.269	19 49 40.2	28.84	15 21 5.3	16 46 40.01	12.320	19 59 37.7	27.82	
16	16 47 15.86	12.317	20 0 58.4	27.65	16 21 6.3	16 51 36.26	12.367	20 10 30.9	26.60	
17	16 52 12.04	12.364	20 11 47.6	26.43	17 21 7.4	16 56 33.64	12.413	20 20 54.6	25.36	
18	16 57 9.34	12.410	20 22 7.3	25.19	18 21 8.4	17 1 32.11	12.458	20 30 48.2	24.09	
19	17 2 7.72	12.454	20 31 56.8	23.92	19 21 9.5	17 6 31.63	12.501	20 40 11.0	22.80	
20	17 7 7.15	12.497	20 41 15.5	22.63	20 21 10.5	17 11 32.18	12.544	20 49 2.5	21.48	
21	17 12 7.59	12.539	20 50 3.0	21.31	21 21 11.6	17 16 33.71	12.584	20 57 22.2	20.14	
22	17 17 9.01	12.579	20 58 18.5	19.97	22 21 12.7	17 21 36.19	12.623	21 5 9.4	18.78	
23	17 22 11.37	12.617	21 6 1.6	18.61	23 21 13.8	17 26 39.58	12.660	21 12 23.7	17.40	
24	17 27 14.64	12.654	21 13 11.7	17.22	24 21 14.9	17 31 43.85	12.695	21 19 4.6	16.00	
25	17 32 18.77	12.689	21 19 48.4	15.82	25 21 16.0	17 36 48.94	12.729	21 25 11.6	14.57	
26	17 37 23.71	12.722	21 25 51.2	14.40	26 21 17.2	17 41 54.83	12.760	21 30 44.2	13.13	
27	17 42 29.43	12.753	21 31 19.6	12.96	27 21 18.4	17 47 1.45	12.790	21 35 42.0	11.67	
28	17 47 35.88	12.783	21 36 13.2	11.50	28 21 19.6	17 52 8.76	12.817	21 40 4.5	10.20	
29	17 52 43.01	12.810	21 40 31.6	10.03	29 21 20.8	17 57 16.71	12.843	21 43 51.5	8.71	
30	17 57 50.76	12.835	21 44 14.4	8.54	30 21 21.9	18 2 25.23	12.866	21 47 2.5	7.20	
31	18 2 59.10	12.858	21 47 21.3	7.03	31 21 23.1	18 7 34.29	12.887	21 49 37.3	5.69	
Feb. 1	18 8 7.96	12.879	21 49 52.0	5.52	1 21 24.4	18 12 43.83	12.906	21 51 35.6	4.16	
2	18 13 17.28	12.897	21 51 46.2	3.99	2 21 25.6	18 17 53.78	12.922	21 52 57.1	2.62	
3	18 18 27.02	12.913	21 53 3.7	2.46	3 21 26.8	18 23 4.10	12.936	21 53 41.5	- 1.08	
4	18 23 37.11	12.927	21 53 44.1	- 0.91	4 21 28.0	18 28 14.72	12.948	21 53 48.8	+ 0.48	
5	18 28 47.50	12.938	21 53 47.4	+ 0.64	5 21 29.2	18 33 25.59	12.956	21 53 18.6	2.04	
6	18 33 58.12	12.946	21 53 13.2	2.20	6 21 30.5	18 38 36.64	12.963	21 52 10.8	3.61	
7	18 39 8.92	12.952	21 52 1.6	3.77	7 21 31.7	18 43 47.82	12.967	21 50 25.4	5.18	
8	18 44 19.84	12.956	21 50 12.4	5.33	8 21 33.0	18 48 59.07	12.969	21 48 2.3	6.75	
9	18 49 30.83	12.958	21 47 45.6	6.90	9 21 34.2	18 54 10.33	12.968	21 45 1.5	8.32	
10	18 54 41.82	12.957	21 44 41.2	8.47	10 21 35.4	18 59 21.55	12.965	21 41 23.0	9.89	
11	18 59 52.77	12.954	21 40 59.1	10.04	11 21 36.7	19 4 32.67	12.960	21 37 6.8	11.46	
12	19 5 3.61	12.948	21 36 39.3	11.60	12 21 37.9	19 9 43.64	12.953	21 32 13.0	13.02	
13	19 10 14.29	12.941	21 31 42.0	13.17	13 21 39.1	19 14 54.40	12.943	21 26 41.6	14.58	
14	19 15 24.76	12.931	21 26 7.2	14.73	14 21 40.4	19 20 4.91	12.931	21 20 32.9	16.14	
15	19 20 34.98	12.919	21 19 55.1	16.28	15 21 41.6	19 25 15.11	12.918	21 13 46.8	17.69	
16	19 25 44.89	12.906	21 13 5.9	17.82	16 21 42.8	19 30 24.97	12.903	21 6 23.7	19.23	
17	19 30 54.45	12.890	21 5 39.7	19.36	17 21 44.0	19 35 34.44	12.886	20 58 23.7	20.76	
18	19 36 3.62	12.873	20 57 36.6	20.89	18 21 45.2	19 40 43.46	12.867	20 49 47.1	22.28	
19	19 41 12.35	12.854	20 48 56.9	22.41	19 21 46.4	19 45 52.01	12.846	20 40 34.1	23.79	
20	19 46 20.60	12.833	20 39 41.0	23.91	20 21 47.6	19 51 0.05	12.824	20 30 45.0	25.29	
21	19 51 28.33	12.811	20 29 49.1	25.41	21 21 48.8	19 56 7.53	12.800	20 20 20.1	26.78	
22	19 56 35.51	12.787	20 19 21.4	26.89	22 21 50.0	20 1 14.42	12.774	20 9 19.6	28.25	
23	20 1 42.10	12.761	20 8 18.3	28.36	23 21 51.1	20 6 20.69	12.748	19 57 44.1	29.70	
24	20 6 48.06	12.735	19 56 40.2	29.81	24 21 52.3	20 11 26.31	12.720	19 45 33.8	31.15	
25	20 11 53.37	12.707	19 44 27.4	31.25	25 21 53.4	20 16 31.24	12.691	19 32 49.1	32.57	
26	20 16 57.99	12.678	19 31 40.2	32.67	26 21 54.5	20 21 35.45	12.660	19 19 30.3	33.98	
27	20 22 1.90	12.647	19 18 19.1	34.08	27 21 55.7	20 26 38.91	12.628	19 5 38.0	35.37	
28	20 27 5.06	12.615	19 4 24.5	35.47	28 21 56.8	20 31 41.59	12.596	18 51 12.5	36.74	
29	20 32 7.44	12.583	18 49 57.0	36.83	29 21 57.9	20 36 43.48	12.561	18 36 14.3	38.09	
30	20 37 9.03	12.549	-18 34 56.8	+38.17	30 21 58.9	20 41 44.53	12.526	-18 20 44.1	+39.41	

Date. 1872.	FOR WASHINGTON MEAN NOON.					FOR MERIDIAN TRANSIT.				
	Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Mean Time of Transit.	Apparent Right Ascension.	Diff. for 1 h. of Long.	Apparent Declination.	Diff. for 1 hour of Long.	
Mar. 1	20 37 9.03	12.549	-18 34 56.8	+36.17	1 21 58.9	20 41 44.53	12.526	-18 20 44.1	+30.41	
2	20 42 9.79	12.514	18 19 24.6	39.50	2 22 0.0	20 46 44.74	12.491	18 4 42.4	40.72	
3	20 47 9.71	12.479	18 3 20.8	40.80	3 22 1.0	20 51 44.09	12.454	17 48 9.5	42.01	
4	20 52 8.77	12.442	17 46 46.0	42.08	4 22 2.0	20 56 42.55	12.417	17 31 5.9	43.27	
5	20 57 6.94	12.405	17 29 40.7	43.34	5 22 3.0	21 1 40.11	12.379	17 13 32.4	44.51	
6	21 2 4.22	12.367	17 12 5.5	44.58	6 22 4.0	21 6 36.75	12.341	16 55 29.4	45.72	
7	21 7 0.58	12.329	16 54 1.0	45.79	7 22 5.0	21 11 32.45	12.302	16 36 57.6	46.91	
8	21 11 56.01	12.290	16 35 27.7	46.97	8 22 6.0	21 16 27.22	12.262	16 17 57.6	48.07	
9	21 16 50.50	12.251	16 16 26.2	48.13	9 22 6.9	21 21 21.03	12.222	15 58 30.0	49.21	
10	21 21 44.05	12.211	15 56 57.2	49.27	10 22 7.9	21 26 13.89	12.182	15 38 35.4	50.32	
11	21 26 36.65	12.171	15 37 1.3	50.38	11 22 8.8	21 31 5.79	12.142	15 18 14.4	51.41	
12	21 31 28.28	12.131	15 16 39.1	51.46	12 22 9.7	21 35 56.72	12.103	14 57 27.8	52.47	
13	21 36 18.96	12.092	14 55 51.3	52.51	13 22 10.6	21 40 46.71	12.062	14 36 16.1	53.50	
14	21 41 8.69	12.052	14 34 38.5	53.54	14 22 11.5	21 45 35.74	12.023	14 14 39.9	54.50	
15	21 45 57.48	12.013	14 13 1.3	54.54	15 22 12.3	21 50 23.83	11.984	13 52 40.1	55.47	
16	21 50 45.33	11.974	13 51 0.5	55.51	16 22 13.1	21 55 10.98	11.946	13 30 17.2	56.42	
17	21 55 32.24	11.936	13 28 36.7	56.46	17 22 13.9	21 59 57.21	11.907	13 7 31.8	57.34	
18	22 0 18.24	11.898	13 5 50.5	57.38	18 22 14.7	22 4 42.53	11.869	12 44 24.6	58.24	
19	22 5 3.34	11.860	12 42 42.5	58.27	19 22 15.5	22 9 26.96	11.833	12 20 56.3	59.10	
20	22 9 47.55	11.824	12 19 13.4	59.13	20 22 16.3	22 14 10.51	11.797	11 57 7.6	59.94	
21	22 14 30.88	11.788	11 55 24.0	59.97	21 22 17.1	22 18 53.21	11.762	11 32 50.0	60.75	
22	22 19 13.36	11.753	11 31 14.8	60.78	22 22 17.9	22 23 35.07	11.728	11 8 31.4	61.53	
23	22 23 55.02	11.720	11 6 46.6	61.56	23 22 18.6	22 28 16.12	11.694	10 43 45.3	62.29	
24	22 28 35.87	11.686	10 42 0.1	62.31	24 22 19.3	22 32 56.38	11.661	10 18 41.4	63.02	
25	22 33 15.93	11.653	10 16 55.7	63.04	25 22 20.0	22 37 35.87	11.630	9 53 20.4	63.72	
26	22 37 55.23	11.622	9 51 34.2	63.73	26 22 20.7	22 42 14.62	11.600	9 27 42.9	64.39	
27	22 42 33.80	11.592	9 25 56.3	64.40	27 22 21.4	22 46 52.65	11.570	9 1 49.6	65.03	
28	22 47 11.65	11.563	9 0 2.8	65.05	28 22 22.1	22 51 29.99	11.542	8 35 41.2	65.65	
29	22 51 48.82	11.535	8 33 54.1	65.66	29 22 22.8	22 56 6.67	11.515	8 9 18.4	66.24	
30	22 56 25.33	11.508	8 7 31.1	66.24	30 22 23.4	23 0 42.72	11.489	7 42 41.9	66.80	
31	23 1 1.20	11.482	7 40 54.4	66.80	31 22 24.1	23 5 18.16	11.464	7 15 52.3	67.32	
Apr. 1	23 5 36.48	11.458	7 14 4.7	67.33	1 22 24.7	23 9 53.02	11.440	6 48 50.4	67.82	
2	23 10 11.18	11.434	6 47 2.7	67.83	2 22 25.3	23 14 27.33	11.418	6 21 36.8	68.30	
3	23 14 45.33	11.412	6 19 49.0	68.30	3 22 26.0	23 19 1.11	11.397	5 54 12.2	68.74	
4	23 19 18.96	11.391	5 52 24.5	68.73	4 22 26.6	23 23 34.41	11.378	5 26 37.4	69.15	
5	23 23 52.11	11.372	5 24 49.8	69.15	5 22 27.2	23 28 7.24	11.359	4 58 53.0	69.53	
6	23 28 24.80	11.352	4 57 5.5	69.53	6 22 27.7	23 32 39.64	11.342	4 30 59.8	69.89	
7	23 32 57.06	11.336	4 29 12.4	69.88	7 22 28.3	23 37 11.65	11.326	4 2 58.4	70.19	
8	23 37 28.93	11.320	4 1 11.2	70.20	8 22 28.9	23 41 43.29	11.311	3 34 49.5	70.51	
9	23 42 0.44	11.306	3 33 2.6	70.50	9 22 29.5	23 46 14.60	11.296	3 6 33.9	70.78	
10	23 46 31.62	11.293	3 4 47.2	70.76	10 22 30.0	23 50 45.61	11.287	2 38 12.2	71.01	
11	23 51 2.51	11.282	2 36 25.9	71.00	11 22 30.6	23 55 16.36	11.277	2 9 45.2	71.22	
12	23 55 33.14	11.273	2 7 59.2	71.21	12 22 31.2	23 59 46.88	11.268	1 41 13.6	71.40	
13	0 0 3.55	11.263	1 30 28.0	71.38	13 22 31.7	0 4 17.22	11.261	1 12 37.9	71.55	
14	0 4 33.77	11.256	1 10 52.7	71.53	14 22 32.4	0 8 47.41	11.255	0 43 58.9	71.68	
15	0 9 3.84	11.251	0 42 14.3	71.66	15 22 32.9	0 13 17.48	11.251	- 0 15 17.3	71.77	
16	0 13 33.81	11.247	- 0 13 33.2	71.75	16 22 33.5	0 17 47.49	11.249	+ 0 13 26.3	71.84	
17	0 18 3.71	11.245	+ 0 15 9.8	71.82	17 22 34.0	0 22 17.46	11.249	0 42 11.1	71.88	
18	0 22 33.57	11.245	+ 0 43 54.0	71.85	18 22 34.6	0 26 47.44	11.250	1 10 56.5	71.89	
19	0 27 3.45	11.246	1 12 38.8	71.86	19 22 35.1	0 31 17.47	11.253	1 39 41.8	71.88	
20	0 31 33.38	11.249	1 41 23.5	71.84	20 22 35.7	0 35 47.59	11.257	2 8 26.5	71.83	
21	0 36 3.40	11.253	2 10 7.4	71.80	21 22 36.3	0 40 17.84	11.264	2 37 9.7	71.76	
22	0 40 33.55	11.260	2 38 49.8	71.72	22 22 36.8	0 44 48.25	11.272	3 5 50.8	71.65	
23	0 45 3.87	11.268	3 7 30.1	71.62	23 22 37.4	0 49 18.88	11.281	3 34 29.1	71.53	
24	0 49 34.41	11.277	3 36 7.6	71.49	24 22 37.9	0 53 49.76	11.293	4 3 4.1	71.37	
25	0 54 5.19	11.289	4 4 41.6	71.33	25 22 38.5	0 58 20.93	11.306	4 31 34.9	71.19	
26	0 58 36.27	11.302	4 33 11.5	71.15	26 22 39.1	1 2 52.42	11.320	5 0 1.0	70.97	
27	1 3 7.68	11.316	5 1 36.7	70.93	27 22 39.7	1 7 24.29	11.336	5 28 21.6	70.73	
28	1 7 39.46	11.332	5 29 56.3	70.69	28 22 40.3	1 11 56.56	11.354	5 56 36.1	70.46	
29	1 12 11.64	11.350	5 58 9.7	70.41	29 22 40.9	1 16 29.28	11.374	6 24 43.7	70.16	
30	1 16 44.27	11.370	6 26 16.1	70.11	30 22 41.5	1 21 2.47	11.394	6 52 43.7	69.83	
31	1 21 17.37	11.390	+ 6 54 15.0	+69.78	31 22 42.1	1 25 36.18	11.416	+ 7 20 35.4	+69.47	



		FOR WASHINGTON MEAN NOON.					FOR MERIDIAN TRANSIT.				
Date.		Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Mean Time of Transit.	Apparent Right Ascension.	Diff. for 1 h. of Long.	Apparent Declination.	Diff. for 1 hour of Long.	
1872.		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>	<sup>d</sup> <sup>h</sup> <sup>m</sup>	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>	
May	1	1 21 17.37	11.390	+ 6 54 15.0	+69.78	1 22 42.1	1 25 36.18	11.416	+ 7 20 35.4	+69.47	
	2	1 25 50.99	11.412	7 22 5.5	69.42	2 22 42.7	1 30 10.44	11.440	7 48 18.2	69.08	
	3	1 30 25.16	11.436	7 49 47.1	69.03	3 22 43.4	1 34 45.28	11.465	8 15 51.3	68.66	
	4	1 34 59.91	11.461	8 17 18.9	68.61	4 22 44.0	1 39 20.73	11.491	8 43 14.0	68.21	
	5	1 39 35.27	11.487	8 44 40.3	68.16	5 22 44.7	1 43 56.83	11.518	9 10 25.6	67.73	
	6	1 44 11.28	11.514	9 11 50.5	67.68	6 22 45.3	1 48 33.61	11.547	9 37 25.3	67.22	
	7	1 48 47.97	11.543	9 38 48.8	67.17	7 22 46.0	1 53 11.10	11.577	10 4 12.4	66.68	
	8	1 53 25.37	11.578	10 5 34.5	66.62	8 22 46.7	1 57 49.33	11.609	10 30 46.2	66.11	
	9	1 58 3.50	11.605	10 32 6.8	66.05	9 22 47.4	2 2 28.33	11.641	10 57 5.8	65.51	
	10	2 2 42.40	11.637	10 58 24.9	65.45	10 22 48.1	2 7 8.13	11.675	11 23 10.7	64.88	
	11	2 7 22.10	11.671	11 24 28.3	64.82	11 22 48.8	2 11 48.75	11.710	11 49 0.1	64.22	
	12	2 12 2.62	11.706	11 50 16.2	64.16	12 22 49.6	2 16 30.23	11.746	12 14 33.4	63.53	
	13	2 16 44.00	11.742	12 15 47.8	63.47	13 22 50.4	2 21 12.59	11.784	12 39 49.7	62.81	
	14	2 21 26.26	11.780	12 41 2.5	62.74	14 22 51.2	2 25 55.85	11.823	13 4 48.4	62.06	
	15	2 26 9.42	11.818	13 5 59.6	61.99	15 22 52.0	2 30 40.06	11.862	13 29 28.8	61.28	
	16	2 30 53.51	11.857	13 30 38.2	61.21	16 22 52.8	2 35 25.23	11.902	13 53 50.1	60.47	
	17	2 35 38.57	11.897	13 54 57.8	60.40	17 22 53.6	2 40 11.38	11.944	14 17 51.6	59.63	
	18	2 40 24.60	11.939	14 18 57.5	59.56	18 22 54.4	2 44 58.53	11.986	14 41 32.6	58.76	
	19	2 45 11.63	11.981	14 42 36.7	58.69	19 22 55.3	2 49 46.71	12.029	15 4 52.3	57.86	
	20	2 49 59.68	12.024	15 5 54.6	57.79	20 22 56.4	2 54 35.94	12.073	15 27 50.0	56.93	
	21	2 54 48.78	12.068	15 28 50.5	56.86	21 22 57.1	2 59 26.24	12.117	15 50 25.1	55.98	
	22	2 59 38.94	12.112	15 51 23.8	55.90	22 22 58.0	3 4 17.61	12.163	16 12 36.9	54.99	
	23	3 4 30.18	12.158	16 13 33.7	54.91	23 22 58.9	3 9 10.09	12.209	16 34 24.6	53.97	
	24	3 9 22.51	12.203	16 35 19.6	53.90	24 22 59.8	3 14 3.67	12.256	16 55 47.6	52.93	
	25	3 14 15.95	12.250	16 56 40.7	52.85	25 23 0.8	3 18 58.37	12.302	17 16 45.2	51.85	
	26	3 19 10.50	12.296	17 17 36.3	51.77	26 23 1.8	3 23 54.21	12.350	17 37 16.6	50.75	
	27	3 24 6.18	12.343	17 38 5.8	50.67	27 23 2.8	3 28 51.18	12.398	17 57 21.1	49.61	
	28	3 29 2.99	12.391	17 58 8.3	49.53	28 23 3.8	3 33 49.29	12.445	18 16 58.0	48.45	
	29	3 34 0.93	12.438	18 17 43.4	48.37	29 23 4.9	3 38 48.54	12.492	18 36 6.7	47.26	
	30	3 39 0.00	12.485	18 36 50.1	47.18	30 23 5.9	3 43 48.92	12.539	18 54 46.4	46.04	
	31	3 44 0.21	12.532	18 55 27.8	45.98	31 23 7.0	3 48 50.44	12.587	19 12 56.4	44.79	
June	1	3 49 1.55	12.579	19 13 35.9	44.71	1 23 8.1	3 53 53.09	12.633	19 30 36.1	43.51	
	2	3 54 4.00	12.625	19 31 13.7	43.43	2 23 9.2	3 58 56.85	12.679	19 47 44.8	42.20	
	3	3 59 7.57	12.671	19 48 20.5	42.12	3 23 10.4	4 4 1.71	12.726	20 4 21.8	40.87	
	4	4 4 12.23	12.717	20 4 55.6	40.79	4 23 11.5	4 9 7.67	12.771	20 20 26.6	39.51	
	5	4 9 17.98	12.762	20 20 58.5	39.43	5 23 12.7	4 14 14.70	12.815	20 35 58.4	38.12	
	6	4 14 24.79	12.806	20 36 28.4	38.05	6 23 13.9	4 19 22.78	12.858	20 50 56.6	36.71	
	7	4 19 32.65	12.849	20 51 24.7	36.64	7 23 15.1	4 24 31.89	12.900	21 5 20.5	35.27	
	8	4 24 41.54	12.891	21 5 46.9	35.20	8 23 16.3	4 29 42.01	12.942	21 19 9.7	33.81	
	9	4 29 51.42	12.932	21 19 34.3	33.74	9 23 17.6	4 34 53.11	12.982	21 32 23.5	32.32	
	10	4 35 2.28	12.972	21 32 46.3	32.25	10 23 18.8	4 40 5.15	13.021	21 45 1.3	30.81	
	11	4 40 14.08	13.011	21 45 22.4	30.74	11 23 20.1	4 45 18.11	13.058	21 57 2.6	29.28	
	12	4 45 26.80	13.048	21 57 22.1	29.21	12 23 21.4	4 50 31.96	13.094	22 8 26.9	27.73	
	13	4 50 40.39	13.083	22 8 44.8	27.67	13 23 22.7	4 55 46.66	13.129	22 19 13.8	26.16	
	14	4 55 54.83	13.118	22 19 30.1	26.10	14 23 24.0	5 1 2.18	13.163	22 29 22.7	24.57	
	15	5 1 10.08	13.151	22 29 37.4	24.51	15 23 25.3	5 6 18.48	13.195	22 38 53.2	22.96	
	16	5 6 26.10	13.183	22 39 6.5	22.90	16 23 26.7	5 11 35.52	13.225	22 47 44.7	21.33	
	17	5 11 42.86	13.213	22 47 56.6	21.27	17 23 28.0	5 16 53.25	13.253	22 55 57.1	19.69	
	18	5 17 0.31	13.241	22 56 7.6	19.63	18 23 29.4	5 22 11.64	13.279	23 3 29.8	18.03	
	19	5 22 18.41	13.267	23 3 39.0	17.98	19 23 30.8	5 27 30.63	13.303	23 10 22.5	16.36	
	20	5 27 37.12	13.291	23 10 30.5	16.31	20 23 32.1	5 32 50.19	13.325	23 16 34.9	14.67	
	21	5 32 56.38	13.313	23 16 41.7	14.62	21 23 33.5	5 38 10.27	13.346	23 22 6.6	12.97	
	22	5 38 16.16	13.334	23 22 12.4	12.92	22 23 34.9	5 43 30.82	13.365	23 26 57.4	11.26	
	23	5 43 36.41	13.352	23 27 2.1	11.22	23 23 36.3	5 48 51.78	13.381	23 31 7.0	9.54	
	24	5 48 57.06	13.368	23 31 10.8	9.50	24 23 37.7	5 54 13.10	13.395	23 34 35.2	7.80	
	25	5 54 18.07	13.382	23 34 38.1	7.77	25 23 39.1	5 59 34.73	13.406	23 37 21.5	6.06	
	26	5 59 39.39	13.393	23 37 23.6	6.03	26 23 40.5	6 4 56.62	13.416	23 39 26.2	4.33	
	27	6 5 0.96	13.403	23 39 27.6	4.30	27 23 41.9	6 10 18.70	13.423	23 40 49.3	2.58	
	28	6 10 22.73	13.410	23 40 50.1	2.55	28 23 43.4	6 15 40.93	13.428	23 41 30.1	+ 0.82	
	29	6 15 44.64	13.415	23 41 30.3	+ 0.80	29 23 44.8	6 21 3.23	13.430	23 41 28.7	- 0.93	
	30	6 21 6.63	13.417	23 41 28.5	- 0.95	30 23 46.2	6 26 25.56	13.429	23 40 45.1	2.69	
	31	6 26 28.64	13.416	+23 40 44.6	- 2.71	31 23 47.6	6 31 47.55	13.426	+23 39 19.4	- 4.45	

Date. 1872.	FOR WASHINGTON MEAN NOON.					FOR MERIDIAN TRANSIT.				
	Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Mean Time of Transit.	Apparent Right Ascension.	Diff. for 1 h. of Long.	Apparent Declination.	Diff. for 1 hour of Long.	
July	1 6 26 28.64	13.416	+23 40 44.6	- 2.71	1 23 47.6	6 31 47.85	13.426	+23 39 19.4	- 4.45	
	2 6 31 50.61	13.413	23 39 18.5	4.46	2 23 49.0	6 37 10.04	13.421	23 37 11.4	6.21	
	3 6 37 12.49	13.408	23 37 10.3	6.22	3 23 50.5	6 42 32.08	13.413	23 34 21.3	7.96	
	4 6 42 34.20	13.400	23 34 20.0	7.97	4 23 51.9	6 47 53.91	13.403	23 30 49.0	9.72	
	5 6 47 55.71	13.390	23 30 47.7	9.72	5 23 53.3	6 53 15.46	13.391	23 26 34.8	11.46	
	6 6 53 16.95	13.378	23 26 33.6	11.46	6 23 54.7	6 58 36.69	13.376	23 21 38.8	13.20	
	7 6 58 37.85	13.363	23 21 37.6	13.20	7 23 56.1	7 3 57.50	13.358	23 16 1.0	14.94	
	8 7 3 58.36	13.345	23 16 0.1	14.93	8 23 57.5	7 9 17.88	13.339	23 9 41.8	16.66	
	9 7 9 18.43	13.326	23 9 41.1	16.65	9 23 58.9	7 14 37.75	13.317	23 2 41.3	18.37	
	10 7 14 38.00	13.304	23 2 41.0	18.36						
	11 7 19 57.01	13.280	22 55 0.0	20.05	11 0 0.3	7 19 57.07	13.293	22 54 59.9	20.07	
	12 7 25 15.42	13.253	22 46 38.4	21.74	12 0 1.7	7 25 15.78	13.266	22 46 37.8	21.76	
	13 7 30 33.18	13.226	22 37 36.4	23.41	13 0 3.0	7 30 33.84	13.238	22 37 35.3	23.44	
	14 7 35 50.25	13.196	22 27 54.5	25.07	14 0 4.3	7 35 51.20	13.208	22 27 52.8	25.10	
	15 7 41 6.58	13.164	22 17 33.0	26.71	15 0 5.7	7 41 7.82	13.176	22 17 30.5	26.74	
	16 7 46 22.13	13.131	22 6 32.3	28.34	16 0 7.0	7 46 23.66	13.143	22 6 29.0	28.37	
	17 7 51 36.86	13.096	21 54 52.7	29.95	17 0 8.3	7 51 38.66	13.108	21 54 48.6	29.98	
	18 7 56 50.73	13.060	21 42 34.8	31.54	18 0 9.6	7 56 52.81	13.072	21 42 29.8	31.57	
	19 8 2 3.71	13.022	21 29 39.0	33.11	19 0 10.9	8 2 6.06	13.033	21 29 33.0	33.15	
	20 8 7 15.77	12.983	21 16 5.7	34.65	20 0 12.1	8 7 18.39	12.994	21 15 58.7	34.70	
	21 8 12 26.88	12.943	21 1 55.5	36.18	21 0 13.4	8 12 29.76	12.954	21 1 47.5	36.23	
	22 8 17 37.02	12.901	20 47 9.0	37.69	22 0 14.6	8 17 40.15	12.912	20 46 59.8	37.74	
	23 8 22 46.15	12.859	20 31 46.4	39.18	23 0 15.8	8 22 49.53	12.869	20 31 36.2	39.22	
	24 8 27 54.26	12.816	20 15 48.6	40.64	24 0 17.0	8 27 57.89	12.826	20 15 37.1	40.69	
	25 8 33 1.32	12.772	19 59 15.9	42.08	25 0 18.2	8 33 5.19	12.782	19 59 3.1	42.13	
	26 8 38 7.33	12.728	19 42 8.9	43.49	26 0 19.3	8 38 11.42	12.737	19 41 54.9	43.54	
	27 8 43 12.26	12.682	19 24 28.3	44.88	27 0 20.5	8 43 16.57	12.691	19 24 13.0	44.93	
	28 8 48 16.09	12.637	19 6 14.8	46.24	28 0 21.6	8 48 20.62	12.646	19 5 58.1	46.30	
	29 8 53 18.82	12.590	18 47 28.8	47.58	29 0 22.7	8 53 23.57	12.599	18 47 10.8	47.63	
	30 8 58 20.44	12.544	18 28 11.1	48.89	30 0 23.8	8 58 25.39	12.553	18 27 51.7	48.94	
Aug.	1 9 3 20.93	12.497	18 8 22.2	50.17	31 0 24.8	9 3 26.09	12.505	18 8 1.4	50.23	
	2 9 8 20.30	12.450	17 48 9.9	51.43	1 0 25.9	9 8 25.65	12.458	17 47 40.7	51.49	
	3 9 13 18.53	12.403	17 27 13.7	52.65	2 0 26.9	9 13 24.08	12.411	17 26 50.1	52.71	
	4 9 18 15.64	12.356	17 5 55.4	53.85	3 0 27.9	9 18 21.37	12.364	17 5 30.4	53.91	
	5 9 23 11.61	12.309	16 44 8.7	55.02	4 0 28.9	9 23 17.53	12.317	16 43 42.2	55.08	
	6 9 28 6.45	12.261	16 21 54.2	56.16	5 0 29.9	9 28 12.54	12.269	16 21 26.2	56.22	
	7 9 33 0.16	12.214	15 59 12.8	57.27	6 0 30.8	9 33 6.42	12.221	15 58 43.4	57.33	
	8 9 37 52.74	12.168	15 36 5.1	58.35	7 0 31.7	9 37 59.17	12.175	15 35 34.2	58.41	
	9 9 42 44.20	12.122	15 12 31.8	59.41	8 0 32.6	9 42 50.80	12.129	15 11 59.5	59.46	
	10 9 47 34.57	12.076	14 48 33.7	60.43	9 0 33.5	9 47 41.32	12.082	14 47 59.9	60.48	
	11 9 52 23.85	12.031	14 24 11.4	61.41	10 0 34.4	9 52 30.76	12.037	14 23 36.2	61.48	
	12 9 57 12.06	11.987	13 59 25.7	62.37	11 0 35.3	9 57 19.11	11.993	13 58 49.0	62.43	
	13 10 1 59.21	11.943	13 34 17.4	63.30	12 0 36.2	10 2 6.41	11.949	13 33 39.3	63.36	
	14 10 6 45.33	11.898	13 8 47.1	64.20	13 0 37.0	10 6 52.66	11.906	13 8 7.5	64.26	
	15 10 11 30.43	11.858	12 42 55.6	65.07	14 0 37.8	10 11 37.89	11.863	12 42 14.6	65.13	
	16 10 16 14.53	11.818	12 16 43.6	65.91	15 0 38.6	10 16 22.13	11.822	12 16 1.3	65.97	
	17 10 20 57.67	11.778	11 50 11.9	66.72	16 0 39.3	10 21 5.40	11.783	11 49 28.2	66.77	
	18 10 25 39.88	11.740	11 23 21.2	67.50	17 0 40.1	10 25 47.73	11.745	11 22 36.1	67.55	
	19 10 30 21.17	11.702	10 56 12.2	68.24	18 0 40.8	10 30 29.15	11.707	10 55 25.7	68.30	
	20 10 35 1.58	11.666	10 28 45.6	68.96	19 0 41.6	10 35 9.68	11.671	10 27 57.8	69.01	
	21 10 39 41.15	11.631	10 1 2.2	69.64	20 0 42.3	10 39 49.36	11.636	10 0 13.1	69.70	
	22 10 44 19.90	11.598	9 33 2.6	70.30	21 0 43.0	10 44 28.22	11.603	9 32 12.2	70.35	
	23 10 48 57.87	11.566	9 4 47.7	70.93	22 0 43.7	10 49 6.30	11.571	9 3 56.0	70.98	
	24 10 53 35.09	11.536	8 36 18.0	71.53	23 0 44.4	10 53 43.62	11.540	8 35 25.0	71.58	
	25 10 58 11.60	11.507	8 7 34.3	72.10	24 0 45.1	10 58 20.23	11.511	8 6 40.1	72.15	
	26 11 2 47.43	11.480	7 38 37.3	72.63	25 0 45.7	11 2 56.17	11.484	7 37 42.0	72.68	
	27 11 7 22.62	11.454	7 9 27.9	73.14	26 0 46.3	11 7 31.47	11.458	7 8 31.4	73.19	
	28 11 11 57.21	11.430	6 40 6.6	73.62	27 0 47.0	11 12 6.16	11.434	6 39 8.9	73.66	
	29 11 16 31.24	11.407	6 10 34.2	74.05	28 0 47.6	11 16 40.29	11.411	6 9 35.4	74.11	
	30 11 21 4.73	11.385	5 40 51.5	74.48	29 0 48.2	11 21 13.88	11.389	5 39 51.6	74.53	
	31 11 25 37.74	11.366	5 10 59.1	74.87	30 0 48.8	11 25 46.99	11.370	5 9 58.2	74.91	
	32 11 30 10.29	11.348	+ 4 40 57.7	-75.22	31 0 49.4	11 30 19.64	11.352	+ 4 39 55.8	-75.27	

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	Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Mean Time of Transit.	Apparent Right Ascension.	Diff. for 1 h. of Long.	Apparent Declination.	Diff. for 1 hour of Long.
Sept. 1	<sup>h</sup> 11 <sup>m</sup> 34 <sup>s</sup> 42.42	11.331	+ 4 10 48.3	-75.55	<sup>d</sup> 1 <sup>h</sup> 0 <sup>m</sup> 50.0	<sup>h</sup> 11 <sup>m</sup> 34 <sup>s</sup> 51.87	11.335	+ 4 9 45.3	-75.59
2	11 39 14.19	11.316	3 40 31.3	75.84	2 0 50.6	11 39 23.74	11.320	3 39 27.4	75.88
3	11 43 45.61	11.303	3 10 7.7	76.11	3 0 51.2	11 43 55.96	11.307	3 9 2.8	76.15
4	11 48 16.74	11.291	2 39 38.2	76.34	4 0 51.8	11 48 26.48	11.295	2 38 32.3	76.38
5	11 52 47.61	11.282	2 9 3.5	76.54	5 0 52.3	11 52 57.45	11.286	2 7 56.7	76.58
6	11 57 18.26	11.273	1 38 24.2	76.71	6 0 52.9	11 57 28.90	11.277	1 37 16.6	76.75
7	12 1 48.73	11.267	1 7 41.2	76.85	7 0 53.5	12 1 58.77	11.271	1 6 32.7	76.89
8	12 6 19.06	11.262	0 36 55.2	76.96	8 0 54.0	12 6 29.90	11.266	0 35 45.9	77.00
9	12 10 49.30	11.259	+ 0 6 6.9	77.04	9 0 54.6	12 10 59.54	11.263	+ 0 4 56.8	77.08
10	12 15 19.48	11.257	- 0 24 43.0	77.10	10 0 55.1	12 15 29.83	11.261	- 0 25 53.8	77.12
11	12 19 49.65	11.258	0 55 33.6	77.11	11 0 55.7	12 20 0.10	11.262	0 56 45.2	77.13
12	12 24 19.85	11.260	1 26 24.2	77.10	12 0 56.3	12 24 30.40	11.264	1 27 36.5	77.12
13	12 28 50.12	11.264	1 57 14.2	77.05	13 0 56.8	12 29 0.78	11.268	1 58 27.2	77.08
14	12 33 20.51	11.270	2 28 2.8	76.98	14 0 57.3	12 33 31.98	11.274	2 29 16.5	77.01
15	12 37 51.06	11.277	2 58 49.3	76.88	15 0 57.9	12 38 1.95	11.282	3 0 3.6	76.90
16	12 42 21.82	11.287	3 29 32.9	76.74	16 0 58.5	12 42 32.82	11.292	3 30 47.8	76.77
17	12 46 52.83	11.298	4 0 13.0	76.58	17 0 59.0	12 47 3.95	11.303	4 1 28.4	76.60
18	12 51 24.13	11.311	4 30 48.7	76.38	18 0 59.6	12 51 25.37	11.316	4 32 4.7	76.41
19	12 55 55.76	11.326	5 1 19.4	76.17	19 1 0.2	12 56 7.14	11.331	5 2 35.9	76.18
20	13 0 27.78	11.343	5 31 44.4	75.90	20 1 0.8	13 0 39.28	11.342	5 33 1.4	75.92
21	13 5 0.23	11.362	6 2 3.0	75.62	21 1 1.4	13 5 11.86	11.367	6 3 20.3	75.64
22	13 9 33.15	11.382	6 32 14.3	75.31	22 1 2.0	13 9 44.91	11.388	6 33 32.1	75.32
23	13 14 6.58	11.404	7 2 17.7	74.96	23 1 2.6	13 14 18.48	11.410	7 3 35.9	74.98
24	13 18 40.57	11.428	7 32 12.5	74.58	24 1 3.2	13 18 52.61	11.434	7 33 31.1	74.60
25	13 23 15.15	11.454	8 1 57.8	74.18	25 1 3.8	13 23 27.34	11.460	8 3 16.8	74.19
26	13 27 50.37	11.481	8 31 33.0	73.74	26 1 4.5	13 28 2.71	11.487	8 32 52.3	73.75
27	13 32 26.26	11.510	9 0 57.2	73.27	27 1 5.1	13 32 38.76	11.517	9 2 16.8	73.28
28	13 37 2.87	11.541	9 30 9.8	72.76	28 1 5.8	13 37 15.54	11.548	9 31 29.6	72.77
29	13 41 40.23	11.573	9 59 9.9	72.23	29 1 6.5	13 41 53.08	11.580	10 0 30.0	72.24
30	13 46 18.37	11.607	10 27 56.8	71.66	30 1 7.2	13 46 31.39	11.614	10 29 17.1	71.67
Oct. 1	13 50 57.34	11.641	10 56 29.7	71.06	1 1 8.0	13 51 10.54	11.649	10 57 50.1	71.07
2	13 55 37.17	11.678	11 24 47.8	70.43	2 1 8.7	13 55 50.55	11.686	11 26 8.5	70.43
3	14 0 17.88	11.715	11 52 50.3	69.76	3 1 9.5	14 0 31.45	11.723	11 54 11.1	69.77
4	14 4 55.51	11.754	12 20 36.5	69.07	4 1 10.2	14 5 13.96	11.762	12 21 57.3	69.07
5	14 9 42.08	11.794	12 48 5.5	68.33	5 1 11.0	14 9 56.03	11.802	12 49 26.3	68.33
6	14 14 25.63	11.835	13 15 16.5	67.57	6 1 11.7	14 14 39.78	11.844	13 16 37.3	67.56
7	14 19 10.18	11.878	13 42 8.7	66.77	7 1 12.5	14 19 24.54	11.887	13 43 29.4	66.76
8	14 23 55.75	11.920	14 8 41.4	65.93	8 1 13.4	14 24 10.34	11.929	14 10 2.0	65.93
9	14 28 42.38	11.965	14 34 53.7	65.07	9 1 14.2	14 28 57.18	11.974	14 36 14.1	65.06
10	14 33 30.07	12.010	15 0 44.8	64.17	10 1 15.1	14 33 45.11	12.020	15 2 5.1	64.16
11	14 38 18.87	12.056	15 26 14.0	63.24	11 1 15.9	14 38 34.13	12.066	15 27 34.0	63.23
12	14 43 8.78	12.103	15 51 20.5	62.28	12 1 16.8	14 43 24.28	12.113	15 52 40.2	62.26
13	14 47 59.83	12.151	16 16 3.3	61.28	13 1 17.8	14 48 15.58	12.161	16 17 22.8	61.26
14	14 52 52.05	12.200	16 40 21.9	60.25	14 1 18.7	14 53 8.05	12.210	16 41 40.9	60.23
15	14 57 45.44	12.249	17 4 15.3	59.19	15 1 19.6	14 58 1.70	12.260	17 5 33.9	59.17
16	15 2 40.02	12.299	17 27 42.9	58.09	16 1 20.6	15 2 56.55	12.310	17 29 1.0	58.07
17	15 7 35.80	12.349	17 50 43.8	56.97	17 1 21.6	15 7 52.60	12.360	17 52 1.3	56.94
18	15 12 32.79	12.400	18 13 17.3	55.81	18 1 22.6	15 12 40.88	12.411	18 14 34.2	55.78
19	15 17 31.01	12.451	18 35 22.6	54.62	19 1 23.6	15 17 48.38	12.463	18 36 38.8	54.59
20	15 22 30.46	12.503	18 56 59.0	53.40	20 1 24.7	15 22 48.11	12.515	18 58 14.3	53.36
21	15 27 31.14	12.554	19 18 5.7	52.14	21 1 25.8	15 27 49.09	12.567	19 19 20.1	52.10
22	15 32 33.06	12.606	19 38 41.8	50.86	22 1 26.9	15 32 51.31	12.619	19 39 55.4	50.82
23	15 37 36.21	12.657	19 58 46.9	49.54	23 1 28.0	15 37 54.77	12.670	19 59 59.5	49.50
24	15 42 40.60	12.708	20 18 20.0	48.20	24 1 29.1	15 42 59.47	12.722	20 19 31.5	48.15
25	15 47 46.21	12.759	20 37 20.4	46.82	25 1 30.3	15 48 5.41	12.773	20 38 30.8	46.77
26	15 52 53.04	12.810	20 55 47.5	45.44	26 1 31.4	15 53 12.56	12.824	20 56 56.6	45.36
27	15 58 1.07	12.859	21 13 40.5	43.98	27 1 32.6	15 58 20.93	12.873	21 14 48.3	43.92
28	16 3 10.29	12.908	21 30 58.6	42.52	28 1 33.8	16 3 30.48	12.922	21 32 5.0	42.45
29	16 8 20.67	12.956	21 47 41.2	41.02	29 1 35.1	16 8 41.20	12.970	21 48 46.1	40.96
30	16 13 32.19	13.003	22 3 47.6	39.50	30 1 36.3	16 13 53.07	13.018	22 4 50.9	39.43
31	16 18 44.83	13.049	22 19 17.2	37.95	31 1 37.6	16 19 6.06	13.064	22 20 18.8	37.88
32	16 23 58.86	13.094	22 34 9.2	36.37	32 1 38.9	16 24 20.14	13.109	22 35 9.1	36.30

Date. 1872.	FOR WASHINGTON MEAN NOON.				FOR MERIDIAN TRANSIT.				
	Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Mean Time of Transit.	Apparent Right Ascension.	Diff. for 1 h. of Long.	Apparent Declination.	Diff. for 1 hour of Long.
Nov. 1	16 23 58.56	13.094	22 34 9.2	-36.37	1 1 38.9	16 24 20.14	13.109	22 35 9.1	-36.30
2	16 29 13.35	13.137	22 48 23.1	34.77	2 1 40.2	16 29 35.29	13.152	22 49 21.1	34.69
3	16 34 29.15	13.179	23 1 58.3	33.14	3 1 41.5	16 34 51.45	13.194	23 2 54.2	33.06
4	16 39 45.92	13.218	23 14 54.0	31.49	4 1 42.8	16 40 8.58	13.233	23 15 47.8	31.40
5	16 45 3.63	13.256	23 27 9.8	29.81	5 1 44.2	16 45 26.65	13.271	23 28 1.3	29.72
6	16 50 22.22	13.292	23 38 45.0	28.11	6 1 45.6	16 50 45.60	13.307	23 39 34.2	28.01
7	16 55 41.64	13.326	23 49 39.2	26.40	7 1 46.9	16 56 5.39	13.341	23 50 26.1	26.29
8	17 1 1.86	13.357	23 59 52.0	24.66	8 1 48.3	17 1 25.97	13.372	24 0 36.3	24.55
9	17 6 22.80	13.387	24 9 22.8	22.90	9 1 49.7	17 6 47.28	13.402	24 10 4.5	22.79
10	17 11 44.44	13.414	24 18 11.2	21.12	10 1 51.1	17 12 9.28	13.429	24 18 50.1	21.01
11	17 17 6.69	13.439	24 26 16.7	19.33	11 1 52.5	17 17 31.90	13.454	24 26 52.8	19.21
12	17 22 29.51	13.461	24 33 39.0	17.52	12 1 54.0	17 22 55.09	13.476	24 34 12.1	17.40
13	17 27 52.84	13.481	24 40 17.8	15.70	13 1 55.4	17 28 18.79	13.496	24 40 47.8	15.57
14	17 33 16.62	13.499	24 46 12.8	13.97	14 1 56.9	17 33 42.93	13.514	24 46 39.6	13.73
15	17 38 40.78	13.513	24 51 23.6	12.03	15 1 58.4	17 39 7.45	13.528	24 51 47.1	11.89
16	17 44 5.27	13.526	24 55 50.1	10.17	16 1 59.8	17 44 32.29	13.541	24 56 10.2	10.03
17	17 49 30.01	13.535	24 59 32.0	8.31	17 2 1.3	17 49 57.38	13.550	24 59 48.6	8.16
18	17 54 54.95	13.542	25 2 29.1	6.44	18 2 2.8	17 55 22.67	13.556	25 2 42.1	6.29
19	18 0 20.02	13.546	25 4 41.3	4.57	19 2 4.3	18 0 48.08	13.560	25 4 50.6	4.41
20	18 5 45.16	13.547	25 6 8.5	2.70	20 2 5.7	18 6 13.56	13.561	25 6 13.9	2.53
21	18 11 10.30	13.546	25 6 50.6	- 0.82	21 2 7.2	18 11 39.03	13.560	25 6 52.1	- 0.65
22	18 16 35.36	13.541	25 6 47.6	+ 1.06	22 2 8.7	18 17 4.42	13.555	25 6 45.1	+ 1.23
23	18 22 0.29	13.534	25 5 59.5	2.95	23 2 10.2	18 22 29.67	13.548	25 5 52.9	3.12
24	18 27 25.00	13.524	25 4 26.2	4.82	24 2 11.7	18 27 54.69	13.537	25 4 15.4	5.00
25	18 32 49.43	13.511	25 2 7.8	6.70	25 2 13.2	18 33 19.42	13.524	25 1 52.7	6.88
26	18 38 13.52	13.495	24 59 4.5	8.57	26 2 14.7	18 38 43.80	13.507	24 58 45.1	8.75
27	18 43 37.19	13.476	24 55 16.4	10.43	27 2 16.1	18 44 7.75	13.488	24 54 52.6	10.62
28	18 49 0.37	13.454	24 50 43.6	12.29	28 2 17.5	18 49 31.20	13.465	24 50 15.3	12.48
29	18 54 23.00	13.430	24 45 26.4	14.14	29 2 18.9	18 54 54.09	13.441	24 44 53.5	14.33
30	18 59 45.00	13.402	24 39 24.9	15.96	30 2 20.4	19 0 16.35	13.412	24 38 47.4	16.17
Dec. 1	19 5 6.31	13.372	24 32 39.5	17.78	1 2 21.8	19 5 37.90	13.382	24 31 57.3	18.00
2	19 10 26.86	13.339	24 25 10.4	19.61	2 2 23.2	19 10 58.67	13.348	24 24 23.4	19.81
3	19 15 46.58	13.303	24 16 58.0	21.41	3 2 24.6	19 16 18.61	13.312	24 16 6.2	21.61
4	19 21 5.42	13.265	24 8 2.6	23.20	4 2 26.0	19 21 37.66	13.273	24 7 6.0	23.40
5	19 26 23.31	13.224	23 58 24.6	24.96	5 2 27.3	19 26 55.74	13.232	23 57 23.2	25.16
6	19 31 40.18	13.181	23 48 4.5	26.71	6 2 28.6	19 32 12.80	13.188	23 46 58.2	26.91
7	19 36 55.99	13.135	23 37 2.7	28.43	7 2 30.0	19 37 28.79	13.142	23 35 51.5	28.63
8	19 42 10.63	13.088	23 25 19.8	30.13	8 2 31.3	19 42 48.65	13.094	23 24 3.7	30.34
9	19 47 24.20	13.038	23 12 56.3	31.81	9 2 32.5	19 47 57.32	13.044	23 11 35.3	32.02
10	19 52 36.50	12.986	22 59 52.7	33.47	10 2 33.8	19 53 9.77	12.992	22 58 26.8	33.68
11	19 57 47.53	12.932	22 46 9.7	35.11	11 2 35.0	19 58 20.94	12.937	22 44 38.8	35.31
12	20 2 57.26	12.877	22 31 47.6	36.72	12 2 36.2	20 3 30.78	12.881	22 30 11.8	36.92
13	20 8 5.64	12.821	22 16 47.2	38.30	13 2 37.4	20 8 39.27	12.824	22 15 6.5	38.50
14	20 13 12.65	12.762	22 1 9.1	39.86	14 2 38.6	20 13 46.38	12.766	21 59 23.5	40.06
15	20 18 18.25	12.703	21 44 54.0	41.39	15 2 39.8	20 18 52.06	12.706	21 43 3.6	41.59
16	20 23 22.40	12.643	21 28 2.4	42.89	16 2 40.9	20 23 56.30	12.646	21 26 7.2	43.09
17	20 28 25.11	12.582	21 10 35.1	44.37	17 2 42.0	20 28 59.07	12.584	21 8 35.2	44.56
18	20 33 26.32	12.520	20 52 32.8	45.81	18 2 43.1	20 34 0.34	12.522	20 50 28.2	46.01
19	20 38 26.05	12.457	20 33 56.2	47.23	19 2 44.1	20 39 0.11	12.459	20 31 46.9	47.42
20	20 43 24.25	12.393	20 14 45.9	48.61	20 2 45.1	20 43 58.35	12.394	20 18 32.0	48.80
21	20 48 20.92	12.329	19 55 2.7	49.97	21 2 46.1	20 48 55.05	12.329	19 52 44.2	50.16
22	20 53 16.04	12.264	19 34 47.4	51.29	22 2 47.1	20 53 50.19	12.264	19 32 24.3	51.48
23	20 58 9.61	12.200	19 14 0.6	52.59	23 2 48.1	20 58 43.77	12.200	19 11 33.0	52.77
24	21 3 1.62	12.134	18 52 43.1	53.85	24 2 49.0	21 3 35.78	12.134	18 50 11.2	54.03
25	21 7 52.06	12.069	18 30 55.7	55.09	25 2 49.9	21 8 26.21	12.068	18 28 19.6	55.26
26	21 12 40.93	12.003	18 8 39.1	56.28	26 2 50.7	21 13 15.07	12.002	18 5 58.8	56.46
27	21 17 28.22	11.938	17 45 54.0	57.45	27 2 51.6	21 18 2.35	11.937	17 43 9.6	57.62
28	21 22 13.93	11.872	17 22 41.3	58.59	28 2 52.4	21 22 48.03	11.871	17 19 52.9	58.75
29	21 26 58.07	11.806	16 59 1.8	59.69	29 2 53.2	21 27 32.13	11.805	16 56 9.4	59.85
30	21 31 40.62	11.740	16 34 56.3	60.76	30 2 54.0	21 32 14.65	11.739	16 32 0.0	60.92
31	21 36 21.61	11.675	16 10 25.5	61.79	31 2 54.7	21 36 55.59	11.673	16 7 25.4	61.95
32	21 41 1.11	11.609	-15 45 30.3	-62.79	32 2 55.4	21 41 34.94	11.607	-15 42 26.5	-62.94

Date. 1872.	FOR WASHINGTON MEAN NOON.					FOR MERIDIAN TRANSIT.				
	Apparent Right Ascension.	Diff. for 1 hour	Apparent Declination.	Diff. for 1 hour.	Mean Time of Transit.	Apparent Right Ascension.	Diff. for 1 h. of Long.	Apparent Declination.	Diff. for 1 hour of Long.	
Jan. 1	h m s	° ' "	° ' "	° ' "	d h m	h m s	° ' "	° ' "	° ' "	° ' "
1	21 2 9.06	+7.920	-18 6 58.6	+34.35	1 2 19.4	21 2 27.46	+7.914	-18 5 38.7	+34.38	
2	21 5 18.92	7.901	17 53 8.5	34.83	2 2 18.6	21 5 37.17	7.895	17 51 48.0	34.85	
3	21 8 28.32	7.883	17 39 7.1	35.29	3 2 17.8	21 8 46.43	7.877	17 37 46.0	35.32	
4	21 11 37.28	7.864	17 24 54.6	35.75	4 2 17.0	21 11 55.25	7.858	17 23 32.9	35.77	
5	21 14 45.80	7.846	17 10 31.2	36.20	5 2 16.2	21 15 3.62	7.840	17 9 9.0	36.22	
6	21 17 53.88	7.827	16 55 57.1	36.64	6 2 15.4	21 18 11.55	7.821	16 54 34.4	36.66	
7	21 21 1.52	7.809	16 41 12.5	37.07	7 2 14.6	21 21 19.04	7.803	16 39 49.3	37.09	
8	21 24 8.72	7.790	16 26 17.6	37.50	8 2 13.8	21 24 26.09	7.785	16 24 53.9	37.52	
9	21 27 15.47	7.772	16 11 12.6	37.92	9 2 13.0	21 27 32.70	7.766	16 9 48.5	37.93	
10	21 30 21.78	7.753	15 55 57.7	38.32	10 2 12.1	21 30 38.85	7.747	15 54 33.2	38.34	
11	21 33 27.63	7.734	15 40 33.1	38.72	11 2 11.3	21 33 44.55	7.728	15 39 8.3	38.73	
12	21 36 33.02	7.715	15 24 59.1	39.11	12 2 10.4	21 36 49.79	7.709	15 23 34.1	39.12	
13	21 39 37.96	7.696	15 9 15.9	39.49	13 2 9.6	21 39 54.58	7.690	15 7 50.6	39.50	
14	21 42 42.45	7.677	14 53 23.6	39.87	14 2 8.7	21 42 58.91	7.671	14 51 58.1	39.87	
15	21 45 46.48	7.659	14 37 22.5	40.23	15 2 7.8	21 46 2.80	7.653	14 35 56.8	40.24	
16	21 48 50.08	7.641	14 21 12.7	40.58	16 2 6.9	21 49 6.24	7.634	14 19 46.8	40.59	
17	21 51 53.23	7.623	14 4 54.6	40.92	17 2 6.1	21 52 9.24	7.616	14 3 28.5	40.93	
18	21 54 55.95	7.604	13 48 28.3	41.26	18 2 5.2	21 55 11.80	7.597	13 47 2.2	41.26	
19	21 57 58.21	7.585	13 31 54.2	41.59	19 2 4.2	21 58 13.91	7.578	13 30 28.0	41.59	
20	22 1 0.01	7.566	13 15 12.2	41.91	20 2 3.3	22 1 15.56	7.560	13 13 46.0	41.90	
21	22 4 1.37	7.548	12 58 22.7	42.22	21 2 2.4	22 4 16.77	7.542	12 56 56.6	42.21	
22	22 7 2.30	7.530	12 41 26.1	42.51	22 2 1.5	22 7 17.55	7.524	12 40 0.0	42.51	
23	22 10 2.81	7.512	12 24 22.3	42.80	23 2 0.6	22 10 17.90	7.506	12 22 56.3	42.80	
24	22 13 2.89	7.494	12 7 11.6	43.09	24 1 59.6	22 13 17.82	7.488	12 5 45.7	43.08	
25	22 16 2.54	7.476	11 49 54.3	43.36	25 1 58.7	22 16 17.32	7.471	11 48 28.6	43.35	
26	22 19 1.78	7.459	11 32 30.6	43.63	26 1 57.7	22 19 16.41	7.454	11 31 5.0	43.61	
27	22 22 0.62	7.442	11 15 0.7	43.88	27 1 56.8	22 22 15.10	7.437	11 13 35.2	43.87	
28	22 24 59.06	7.426	10 57 24.6	44.12	28 1 55.8	22 25 13.39	7.420	10 55 59.4	44.11	
29	22 27 57.11	7.410	10 39 42.7	44.36	29 1 54.8	22 28 11.28	7.404	10 38 17.8	44.35	
30	22 30 54.77	7.395	10 21 55.2	44.60	30 1 53.8	22 31 8.79	7.389	10 20 30.6	44.58	
31	22 33 52.06	7.379	10 4 2.3	44.82	31 1 52.8	22 34 5.93	7.373	10 2 38.0	44.80	
Feb. 1	22 36 48.98	7.364	9 46 4.0	45.03	1 1 51.8	22 37 2.70	7.358	9 44 40.1	45.02	
2	22 39 45.53	7.349	9 28 0.7	45.24	2 1 50.8	22 39 59.11	7.343	9 26 37.1	45.22	
3	22 42 41.73	7.334	9 9 52.7	45.44	3 1 49.8	22 42 55.16	7.328	9 8 29.4	45.42	
4	22 45 37.58	7.320	8 51 43.0	45.63	4 1 48.8	22 45 50.85	7.314	8 50 17.2	45.60	
5	22 48 33.08	7.306	8 33 22.8	45.81	5 1 47.8	22 48 46.21	7.300	8 32 0.5	45.78	
6	22 51 28.26	7.292	8 15 1.5	45.98	6 1 46.8	22 51 41.24	7.286	8 13 39.6	45.95	
7	22 54 23.10	7.278	7 56 36.2	46.14	7 1 45.8	22 54 35.93	7.272	7 55 14.8	46.12	
8	22 57 17.62	7.264	7 38 6.9	46.29	8 1 44.7	22 57 30.30	7.257	7 36 46.1	46.27	
9	23 0 11.83	7.251	7 19 34.1	46.44	9 1 43.7	23 0 24.36	7.246	7 18 13.9	46.41	
10	23 3 5.71	7.238	7 0 58.0	46.58	10 1 42.6	23 3 18.10	7.233	6 59 38.3	46.55	
11	23 5 59.29	7.226	6 42 18.7	46.71	11 1 41.6	23 6 11.53	7.220	6 40 59.6	46.67	
12	23 8 52.57	7.213	6 23 36.5	46.82	12 1 40.5	23 9 4.66	7.207	6 22 18.0	46.79	
13	23 11 45.55	7.201	6 4 51.5	46.93	13 1 39.5	23 11 57.49	7.195	6 3 33.7	46.90	
14	23 14 38.24	7.189	5 46 4.1	47.03	14 1 38.4	23 14 50.03	7.183	5 44 47.0	47.00	
15	23 17 30.64	7.178	5 27 14.3	47.12	15 1 37.3	23 17 42.28	7.171	5 25 57.9	47.09	
16	23 20 22.77	7.167	5 8 22.4	47.20	16 1 36.3	23 20 34.26	7.160	5 7 6.7	47.17	
17	23 23 14.63	7.156	4 49 28.7	47.27	17 1 35.2	23 23 25.98	7.150	4 48 13.7	47.24	
18	23 26 6.23	7.145	4 30 33.3	47.34	18 1 34.1	23 26 17.44	7.139	4 20 19.0	47.31	
19	23 28 57.58	7.135	4 11 36.3	47.40	19 1 33.0	23 29 8.64	7.128	4 10 22.9	47.37	
20	23 31 48.63	7.125	3 52 38.1	47.45	20 1 31.9	23 31 59.60	7.118	3 51 25.4	47.42	
21	23 34 39.55	7.115	3 33 38.8	47.50	21 1 30.8	23 34 50.32	7.109	3 32 26.8	47.46	
22	23 37 30.19	7.105	3 14 38.5	47.53	22 1 29.7	23 37 40.82	7.100	3 13 27.4	47.49	
23	23 40 20.62	7.096	2 55 37.6	47.55	23 1 28.6	23 40 31.10	7.091	2 54 27.3	47.52	
24	23 43 10.83	7.088	2 36 36.1	47.57	24 1 27.5	23 43 21.17	7.082	2 35 26.5	47.54	
25	23 46 0.85	7.080	2 17 34.2	47.59	25 1 26.4	23 46 11.05	7.074	2 16 25.6	47.55	
26	23 48 50.68	7.072	1 58 32.1	47.59	26 1 25.3	23 49 0.74	7.067	1 57 24.4	47.55	
27	23 51 40.34	7.065	1 39 30.0	47.59	27 1 24.2	23 51 50.26	7.060	1 38 23.2	47.55	
28	23 54 29.83	7.059	1 20 28.0	47.58	28 1 23.1	23 54 39.61	7.053	1 19 22.1	47.54	
29	23 57 19.17	7.053	1 1 26.4	47.56	29 1 22.0	23 57 28.80	7.047	1 0 21.4	47.52	
30	0 0 8.35	7.047	0 42 25.2	47.53	30 1 20.8	0 0 17.84	7.041	0 41 21.2	47.49	
31	0 2 57.40	+7.041	-0 23 24.8	+47.50	31 1 19.7	0 3 6.75	+7.035	-0 22 21.7	+47.46	

Date.	FOR WASHINGTON MEAN NOON.				FOR MERIDIAN TRANSIT.				
1872.	Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Mean Time of Transit.	Apparent Right Ascension.	Diff. for 1 h. of Long.	Apparent Declination.	Diff. for 1 hour of Long.
Mar. 1	0 0 8.35	+7.047	- 0 42' 25.2"	+47.53	1 1 20.8	0 0 17.84	+7.041	- 0 41' 21.2"	+47.49
2	0 2 57.40	7.041	- 0 23' 24.8"	47.50	2 1 19.7	0 3 6.75	7.035	- 0 22' 21.7"	47.46
3	0 5 46.31	7.036	- 0 4 25.3"	47.46	3 1 18.6	0 5 55.53	7.030	- 0 3 23.1"	47.42
4	0 8 35.11	7.031	+ 0 14' 33.2"	47.42	4 1 17.5	0 8 44.19	7.025	+ 0 15' 34.4"	47.37
5	0 11 23.79	7.026	0 33' 30.5"	47.36	5 1 16.3	0 11 32.73	7.020	0 34' 30.8"	47.32
6	0 14 12.37	7.022	0 52' 26.4"	47.29	6 1 15.2	0 14 21.17	7.016	0 53' 25.7"	47.25
7	0 17 0.85	7.018	1 11' 20.6"	47.22	7 1 14.1	0 17 9.51	7.012	1 12' 18.9"	47.18
8	0 19 49.23	7.014	1 30' 13.1"	47.15	8 1 12.9	0 19 57.76	7.009	1 31' 10.4"	47.11
9	0 22 37.53	7.010	1 49' 3.7"	47.06	9 1 11.8	0 22 45.92	7.005	1 50' 0.0"	47.02
10	0 25 25.76	7.007	2 7' 52.1"	46.97	10 1 10.7	0 25 34.01	7.002	2 8' 47.4"	46.93
11	0 28 13.91	7.004	2 26' 38.1"	46.87	11 1 9.5	0 28 22.02	6.999	2 27' 32.4"	46.83
12	0 31 1.99	7.002	2 45' 21.6"	46.77	12 1 8.4	0 31 9.97	6.996	2 46' 14.9"	46.72
13	0 33 50.01	7.000	3 4 2.5"	46.65	13 1 7.2	0 33 57.85	6.994	3 4 54.8"	46.63
14	0 36 37.98	6.998	3 22' 40.5"	46.52	14 1 6.1	0 36 45.68	6.992	3 23' 31.8"	46.48
15	0 39 25.90	6.996	3 41' 15.3"	46.39	15 1 5.0	0 39 33.47	6.990	3 42' 5.6"	46.35
16	0 42 13.78	6.995	3 59' 47.0"	46.26	16 1 3.8	0 42 21.22	6.989	4 0' 36.3"	46.21
17	0 45 1.64	6.994	4 18' 15.4"	46.11	17 1 2.7	0 45 8.94	6.988	4 19' 3.6"	46.06
18	0 47 49.47	6.993	4 36' 40.1"	45.96	18 1 1.5	0 47 56.64	6.987	4 37' 27.2"	45.91
19	0 50 37.28	6.992	4 55' 10.1"	45.80	19 1 0.4	0 50 44.32	6.986	4 55' 47.1"	45.75
20	0 53 25.09	6.992	5 13' 18.1"	45.63	20 0 59.2	0 53 31.99	6.986	5 14' 3.1"	45.58
21	0 56 12.90	6.992	5 31' 31.1"	45.46	21 0 58.1	0 56 19.66	6.986	5 32' 15.1"	45.41
22	0 59 0.71	6.992	5 49' 39.9"	45.28	22 0 56.9	0 59 7.34	6.987	5 50' 22.8"	45.23
23	1 1 48.53	6.993	6 7' 44.3"	45.09	23 0 55.8	1 1 55.03	6.988	6 8' 26.2"	45.05
24	1 4 36.38	6.994	6 25' 44.1"	44.90	24 0 54.7	1 4 42.75	6.989	6 26' 25.0"	44.86
25	1 7 24.26	6.995	6 43' 39.3"	44.70	25 0 53.5	1 7 30.51	6.991	6 44' 19.2"	44.66
26	1 10 12.19	6.997	7 1' 29.7"	44.50	26 0 52.4	1 10 18.30	6.992	7 2' 8.5"	44.45
27	1 13 0.17	7.000	7 19' 15.0"	44.29	27 0 51.2	1 13 6.14	6.994	7 19' 52.8"	44.24
28	1 15 48.20	7.003	7 36' 55.2"	44.07	28 0 50.1	1 15 54.04	6.997	7 37' 32.0"	44.02
29	1 18 36.29	7.006	7 54' 30.2"	43.85	29 0 48.9	1 18 42.01	7.000	7 55' 5.9"	43.80
30	1 21 24.47	7.009	8 11' 59.8"	43.62	30 0 47.8	1 21 30.05	7.003	8 12' 34.5"	43.58
31	1 24 12.72	7.012	8 29' 23.8"	43.39	31 0 46.7	1 24 18.17	7.007	8 29' 57.5"	43.34
Apr. 1	1 27 1.06	7.016	8 46' 42.1"	43.15	1 0 45.5	1 27 6.38	7.011	8 47' 14.9"	43.10
2	1 29 49.50	7.020	9 3 54.6"	42.90	2 0 44.4	1 29 54.69	7.015	9 4' 26.3"	42.85
3	1 32 38.03	7.024	9 21' 1.0"	42.64	3 0 43.3	1 32 43.10	7.019	9 21' 31.7"	42.60
4	1 35 26.66	7.029	9 38' 1.4"	42.38	4 0 42.1	1 35 31.60	7.023	9 38' 31.1"	42.35
5	1 38 15.40	7.033	9 54' 55.5"	42.12	5 0 41.0	1 38 20.21	7.028	9 55' 24.3"	42.08
6	1 41 4.27	7.038	10 11' 43.1"	41.85	6 0 39.9	1 41 8.95	7.033	10 12' 10.9"	41.81
7	1 43 53.25	7.043	10 28' 24.1"	41.57	7 0 38.8	1 43 57.80	7.038	10 28' 50.9"	41.53
8	1 46 42.35	7.048	10 44' 58.3"	41.29	8 0 37.6	1 46 46.77	7.043	10 45' 24.2"	41.24
9	1 49 31.58	7.054	11 1' 25.6"	41.00	9 0 36.5	1 49 35.87	7.049	11 1' 50.6"	40.95
10	1 52 20.94	7.059	11 17' 45.9"	40.70	10 0 35.4	1 52 25.10	7.054	11 18' 9.9"	40.66
11	1 55 10.42	7.065	11 33' 59.0"	40.39	11 0 34.3	1 55 14.46	7.059	11 34' 22.1"	40.36
12	1 58 0.04	7.070	11 50' 4.8"	40.08	12 0 33.2	1 58 3.95	7.065	11 50' 26.9"	40.05
13	2 0 49.79	7.076	12 6' 3.0"	39.77	13 0 32.0	2 0 53.58	7.071	12 6' 24.3"	39.73
14	2 3 39.69	7.082	12 21' 53.6"	39.45	14 0 30.9	2 3 43.35	7.077	12 22' 14.0"	39.41
15	2 6 29.74	7.088	12 37' 36.4"	39.12	15 0 29.8	2 6 33.26	7.083	12 37' 55.9"	39.08
16	2 9 19.93	7.094	12 53' 11.2"	38.79	16 0 28.7	2 9 23.32	7.089	12 53' 29.8"	38.75
17	2 12 10.27	7.100	13 8' 37.9"	38.45	17 0 27.6	2 12 13.54	7.096	13 8' 55.7"	38.41
18	2 15 0.76	7.107	13 23' 56.5"	38.10	18 0 26.5	2 15 3.91	7.102	13 24' 13.4"	38.07
19	2 17 51.43	7.114	13 39' 6.8"	37.75	19 0 25.4	2 17 54.44	7.109	13 39' 22.8"	37.72
20	2 20 42.26	7.122	13 54' 8.6"	37.40	20 0 24.3	2 20 45.14	7.116	13 54' 23.8"	37.36
21	2 23 33.25	7.129	14 9' 1.8"	37.04	21 0 23.2	2 23 36.01	7.123	14 9' 16.2"	37.00
22	2 26 24.42	7.136	14 23' 46.4"	36.68	22 0 22.1	2 26 27.05	7.130	14 23' 59.9"	36.64
23	2 29 15.76	7.143	14 38' 22.2"	36.31	23 0 21.1	2 29 18.27	7.138	14 38' 34.9"	36.27
24	2 32 7.27	7.151	14 52' 49.1"	35.94	24 0 20.0	2 32 9.66	7.145	14 53' 1.0"	35.90
25	2 34 58.97	7.158	15 7' 6.9"	35.56	25 0 18.9	2 35 1.23	7.153	15 7' 18.1"	35.52
26	2 37 50.87	7.166	15 21' 15.7"	35.18	26 0 17.8	2 37 52.99	7.161	15 21' 26.1"	35.14
27	2 40 42.95	7.174	15 35' 15.2"	34.79	27 0 16.7	2 40 44.95	7.169	15 35' 24.9"	34.76
28	2 43 35.23	7.183	15 49' 5.4"	34.40	28 0 15.7	2 43 37.10	7.177	15 49' 14.4"	34.37
29	2 46 27.70	7.191	16 2' 46.1"	34.00	29 0 14.6	2 46 29.45	7.185	16 2' 54.4"	33.97
30	2 49 20.37	7.199	16 16' 17.2"	33.59	30 0 13.5	2 49 22.00	7.194	16 16' 24.8"	33.57
31	2 52 13.24	+7.207	+16 29' 38.6"	+33.19	31 0 12.5	2 52 14.74	+7.202	+16 29' 45.5"	+33.16

Date.	FOR WASHINGTON MEAN NOON.					FOR MERIDIAN TRANSIT.				
	Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination	Diff. for 1 hour.	Mean Time of Transit.	Apparent Right Ascension.	Diff. for 1 h. of Long.	Apparent Declination.	Diff. for 1 hour of Long.	
1872.	h m s	"	° ' "	"	d h m	h m s	"	° ' "	"	
May 1	2 52 13.24	+7.247	+16 29 38.6	+33.19	1 0 12.5	2 52 14.74	+7.202	+16 29 45.5	+33.16	
2	2 55 6.31	7.215	16 42 50.2	32.78	2 0 11.4	2 55 7.68	7.210	16 42 56.4	32.75	
3	2 57 59.57	7.224	16 55 51.9	32.36	3 0 10.4	2 58 0.82	7.218	16 55 57.5	32.34	
4	3 0 53.03	7.232	17 8 43.6	31.94	4 0 9.3	3 0 54.16	7.227	17 8 48.6	31.92	
5	3 3 46.70	7.240	17 21 25.2	31.52	5 0 8.3	3 3 47.70	7.235	17 21 29.6	31.50	
6	3 6 40.56	7.249	17 33 56.5	31.09	6 0 7.2	3 6 41.43	7.243	17 34 0.3	31.07	
7	3 9 34.61	7.257	17 46 17.5	30.66	7 0 6.2	3 9 35.36	7.251	17 46 20.7	30.63	
8	3 12 28.86	7.265	17 58 27.9	30.22	8 0 5.2	3 12 29.48	7.259	17 58 30.5	30.19	
9	3 15 23.20	7.272	18 10 27.8	29.77	9 0 4.1	3 15 23.79	7.267	18 10 29.8	29.75	
10	3 18 17.91	7.280	18 22 17.0	29.32	10 0 3.1	3 18 18.28	7.274	18 22 18.5	29.30	
11	3 21 12.71	7.287	18 33 55.3	28.87	11 0 2.1	3 21 12.96	7.282	18 33 56.3	28.85	
12	3 24 7.68	7.295	18 45 22.8	28.41	12 0 1.0	3 24 7.81	7.289	18 45 23.3	28.39	
13	3 27 2.83	7.302	18 56 39.2	27.95	13 0 0.0	3 27 2.84	7.296	18 56 39.2	27.93	
14	3 29 58.16	7.310	19 7 44.6	27.49	13 23 50.0	3 29 58.04	7.304	19 7 44.1	27.47	
15	3 32 53.67	7.317	19 18 38.8	27.03	14 23 58.0	3 32 53.42	7.311	19 18 37.9	27.01	
16	3 35 49.34	7.324	19 29 21.8	26.56	15 23 57.0	3 35 48.97	7.318	19 29 20.4	26.54	
17	3 38 45.18	7.330	19 39 53.3	26.08	16 23 55.9	3 38 44.68	7.325	19 39 51.6	26.06	
18	3 41 41.18	7.337	19 50 12.4	25.60	17 23 54.9	3 41 40.56	7.332	19 50 11.3	25.58	
19	3 44 37.35	7.343	20 0 22.0	25.12	18 23 53.9	3 44 36.60	7.339	20 0 19.5	25.10	
20	3 47 33.68	7.350	20 10 19.0	24.64	19 23 52.9	3 47 32.81	7.345	20 10 16.1	24.62	
21	3 50 30.16	7.356	20 20 4.4	24.15	20 23 51.9	3 50 29.17	7.351	20 20 1.1	24.13	
22	3 53 26.79	7.363	20 29 38.1	23.66	21 23 50.9	3 53 25.68	7.358	20 29 34.5	23.64	
23	3 56 23.58	7.369	20 39 0.0	23.16	22 23 49.9	3 56 22.34	7.364	20 38 56.1	23.15	
24	3 59 20.51	7.375	20 48 10.0	22.67	23 23 48.9	3 59 19.15	7.370	20 48 5.8	22.66	
25	4 2 17.59	7.381	20 57 8.2	22.17	24 23 48.0	4 2 16.11	7.376	20 57 3.7	22.16	
26	4 5 14.82	7.387	21 5 54.3	21.67	25 23 47.0	4 5 13.22	7.382	21 5 49.6	21.66	
27	4 8 12.20	7.393	21 14 28.4	21.17	26 23 46.0	4 8 10.47	7.388	21 14 23.5	21.16	
28	4 11 9.71	7.399	21 22 50.5	20.67	27 23 45.0	4 11 7.86	7.394	21 22 45.4	20.66	
29	4 14 7.35	7.404	21 31 0.4	20.16	28 23 44.0	4 14 5.39	7.399	21 30 55.1	20.15	
30	4 17 5.12	7.409	21 38 58.1	19.65	29 23 43.0	4 17 3.02	7.404	21 38 52.6	19.64	
31	4 20 3.00	7.414	21 46 43.6	19.14	30 23 42.1	4 20 0.78	7.409	21 46 37.9	19.13	
June 1	4 23 1.00	7.419	21 54 16.8	18.63	31 23 41.1	4 22 58.66	7.414	21 54 10.9	18.62	
2	4 25 59.10	7.423	22 1 37.6	18.11	1 23 40.1	4 25 56.64	7.418	22 1 31.6	18.10	
3	4 28 57.29	7.427	22 8 46.0	17.59	2 23 39.1	4 28 54.71	7.422	22 8 39.8	17.58	
4	4 31 55.58	7.431	22 15 41.9	17.07	3 23 38.2	4 31 52.88	7.425	22 15 35.6	17.06	
5	4 34 53.96	7.434	22 22 23.2	16.55	4 23 37.2	4 34 51.13	7.429	22 22 18.9	16.54	
6	4 37 52.41	7.437	22 28 56.0	16.02	5 23 36.2	4 37 49.46	7.432	22 28 49.6	16.02	
7	4 40 50.92	7.439	22 35 14.2	15.50	6 23 35.3	4 40 47.85	7.434	22 35 7.8	15.50	
8	4 43 49.48	7.441	22 41 19.8	14.97	7 23 34.3	4 43 46.30	7.436	22 41 13.4	14.97	
9	4 46 48.09	7.443	22 47 12.7	14.44	8 23 33.3	4 46 44.79	7.438	22 47 6.3	14.44	
10	4 49 46.74	7.444	22 52 52.9	13.91	9 23 32.4	4 49 43.31	7.439	22 52 46.5	13.91	
11	4 52 45.42	7.445	22 58 20.4	13.38	10 23 31.4	4 52 41.87	7.440	22 58 14.0	13.38	
12	4 55 44.13	7.446	23 3 35.1	12.85	11 23 30.4	4 55 40.46	7.441	23 3 28.8	12.85	
13	4 58 42.85	7.447	23 8 36.9	12.32	12 23 29.5	4 58 39.06	7.442	23 8 30.7	12.31	
14	5 1 41.57	7.447	23 13 26.0	11.78	13 23 28.5	5 1 37.66	7.442	23 13 19.8	11.78	
15	5 4 40.29	7.447	23 18 2.3	11.24	14 23 27.6	5 4 36.26	7.441	23 17 56.2	11.25	
16	5 7 39.00	7.446	23 22 25.7	10.71	15 23 26.6	5 7 34.85	7.441	23 22 19.7	10.71	
17	5 10 37.68	7.445	23 26 36.3	10.18	16 23 25.6	5 10 33.42	7.440	23 26 30.4	10.18	
18	5 13 36.34	7.444	23 30 34.1	9.65	17 23 24.7	5 13 31.96	7.438	23 30 28.4	9.65	
19	5 16 34.97	7.443	23 34 19.2	9.12	18 23 23.7	5 16 30.46	7.437	23 34 13.6	9.12	
20	5 19 33.55	7.441	23 37 51.4	8.58	19 23 22.7	5 19 28.93	7.435	23 37 46.0	8.58	
21	5 22 32.09	7.439	23 41 10.7	8.04	20 23 21.8	5 22 27.35	7.433	23 41 5.5	8.04	
22	5 25 30.58	7.436	23 44 17.0	7.50	21 23 20.8	5 25 25.72	7.431	23 44 12.1	7.51	
23	5 28 29.01	7.433	23 47 10.4	6.97	22 23 19.8	5 28 24.03	7.428	23 47 5.8	6.97	
24	5 31 27.37	7.430	23 49 51.1	6.44	23 23 18.9	5 31 22.27	7.425	23 49 46.7	6.44	
25	5 34 25.65	7.427	23 52 19.2	5.91	24 23 17.9	5 34 20.44	7.422	23 52 15.0	5.92	
26	5 37 23.85	7.423	23 54 34.6	5.38	25 23 16.9	5 37 18.52	7.418	23 54 30.7	5.39	
27	5 40 21.96	7.419	23 56 37.1	4.84	26 23 15.9	5 40 16.51	7.414	23 56 33.6	4.85	
28	5 43 19.97	7.415	23 58 26.9	4.31	27 23 15.0	5 43 14.40	7.410	23 58 23.7	4.32	
29	5 46 17.87	7.410	24 0 3.9	3.78	28 23 14.0	5 46 12.18	7.405	24 0 1.0	3.79	
30	5 49 15.65	+7.405	+24 1 28.3	+3.26	29 23 13.0	5 49 9.85	7.400	24 1 25.7	3.27	
					30 23 12.0	5 52 7.39	+7.395	+24 2 37.9	+2.74	

Date. 1872.	FOR WASHINGTON MEAN NOON.				FOR MERIDIAN TRANSIT.				
	Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Mean Time of Transit.	Apparent Right Ascension.	Diff. for 1 h. of Long.	Apparent Declination.	Diff. for 1 hour of Long.
July 1	<sup>h</sup> 5 <sup>m</sup> 52 <sup>s</sup> 13.30	+7.400	+24° 2' 40.1"	+2.73	<sup>d</sup> 1 <sup>h</sup> 23 <sup>m</sup> 11.0	<sup>h</sup> 5 <sup>m</sup> 55 <sup>s</sup> 4.79	+7.389	+24° 3' 37.4"	+2.22
2	5 55 10.82	7.394	24 3 39.2	2.20	2 23 10.1	5 58 2.04	7.382	24 4 24.3	1.69
3	5 58 8.19	7.388	24 4 25.7	1.67	3 23 9.1	6 0 59.13	7.375	24 4 58.5	1.16
4	6 1 5.30	7.381	24 4 59.5	1.15	4 23 8.1	6 3 56.05	7.368	24 5 20.2	0.64
5	6 4 2.43	7.373	24 5 20.8	0.63	5 23 7.1	6 6 52.79	7.360	24 5 29.4	+0.12
6	6 6 59.29	7.365	24 5 29.6	+0.11	6 23 6.1	6 9 49.34	7.352	24 5 26.2	-0.39
7	6 9 55.95	7.357	24 5 25.9	-0.41	7 23 5.1	6 12 45.68	7.343	24 5 10.6	0.91
8	6 12 52.41	7.348	24 5 9.8	0.93	8 23 4.1	6 15 41.81	7.334	24 4 42.7	1.42
9	6 15 48.65	7.339	24 4 41.3	1.45	9 23 3.1	6 18 37.72	7.325	24 4 2.4	1.94
10	6 18 44.67	7.330	24 4 0.5	1.96	10 23 2.1	6 21 33.41	7.315	24 3 9.8	2.45
11	6 21 40.47	7.320	24 3 7.4	2.47	11 23 1.0	6 24 28.85	7.305	24 2 5.0	2.95
12	6 24 36.03	7.310	24 2 2.1	2.98	12 23 0.0	6 27 24.04	7.294	24 0 48.1	3.46
13	6 27 31.34	7.300	24 0 44.6	3.49	13 22 59.0	6 30 18.98	7.283	23 59 19.1	3.96
14	6 30 26.39	7.289	23 59 15.0	3.99	14 22 58.0	6 33 13.65	7.272	23 57 38.0	4.46
15	6 33 21.17	7.278	23 57 33.4	4.49	15 22 56.9	6 36 8.05	7.261	23 55 45.0	4.95
16	6 36 15.69	7.266	23 55 39.8	4.98	16 22 55.9	6 39 2.18	7.249	23 53 40.2	5.45
17	6 39 9.93	7.255	23 53 34.3	5.48	17 22 54.9	6 41 56.02	7.237	23 51 23.5	5.94
18	6 42 3.89	7.243	23 51 17.0	5.97	18 22 53.8	6 44 49.58	7.226	23 48 55.1	6.43
19	6 44 57.56	7.230	23 48 48.0	6.45	19 22 52.8	6 47 42.85	7.214	23 46 15.0	6.91
20	6 47 50.94	7.218	23 46 7.2	6.94	20 22 51.7	6 50 35.83	7.201	23 43 23.3	7.39
21	6 50 44.03	7.206	23 43 14.8	7.42	21 22 50.6	6 53 28.50	7.188	23 40 20.1	7.87
22	6 53 36.81	7.193	23 40 11.0	7.90	22 22 49.6	6 56 20.86	7.175	23 37 5.4	8.35
23	6 56 29.28	7.180	23 36 55.6	8.38	23 22 48.5	6 59 12.91	7.162	23 33 39.4	8.82
24	6 59 21.45	7.167	23 33 28.9	8.85	24 22 47.4	7 2 4.65	7.149	23 30 2.0	9.29
25	7 2 13.30	7.154	23 29 50.8	9.32	25 22 46.3	7 4 56.06	7.135	23 26 13.4	9.76
26	7 5 4.82	7.140	23 26 1.5	9.79	26 22 45.3	7 7 47.12	7.121	23 22 13.7	10.22
27	7 7 56.00	7.126	23 22 1.0	10.25	27 22 44.2	7 10 37.85	7.106	23 18 3.0	10.68
28	7 10 46.84	7.111	23 17 49.5	10.71	28 22 43.1	7 13 28.23	7.092	23 13 41.3	11.13
29	7 13 37.34	7.097	23 13 27.0	11.17	29 22 42.0	7 16 18.26	7.077	23 9 8.8	11.58
30	7 16 27.48	7.082	23 8 53.7	11.62	30 22 40.8	7 19 7.93	7.062	23 4 25.4	12.03
31	7 19 17.26	7.067	23 4 9.5	12.06	31 22 39.7	7 21 57.24	7.047	22 59 31.3	12.47
Aug. 1	7 22 6.68	7.052	22 59 14.6	12.51	1 22 38.6	7 24 46.18	7.031	22 54 26.6	12.91
2	7 24 55.72	7.036	22 54 9.0	12.95	2 22 37.5	7 27 34.73	7.015	22 49 11.4	13.35
3	7 27 44.38	7.020	22 48 53.0	13.38	3 22 36.3	7 30 22.90	6.999	22 43 45.8	13.78
4	7 30 32.66	7.004	22 43 26.6	13.82	4 22 35.2	7 33 10.68	6.982	22 38 9.9	14.21
5	7 33 20.55	6.987	22 37 49.8	14.25	5 22 34.0	7 35 58.06	6.966	22 32 23.7	14.63
6	7 36 8.05	6.970	22 32 2.7	14.67	6 22 32.9	7 38 45.04	6.949	22 26 27.5	15.05
7	7 38 55.14	6.953	22 26 5.6	15.09	7 22 31.7	7 41 31.60	6.931	22 20 21.3	15.47
8	7 41 41.81	6.936	22 19 58.5	15.51	8 22 30.6	7 44 17.74	6.914	22 14 5.2	15.88
9	7 44 28.06	6.918	22 13 41.5	15.92	9 22 29.4	7 47 3.47	6.897	22 7 39.2	16.28
10	7 47 13.90	6.901	22 7 14.6	16.33	10 22 28.2	7 49 48.78	6.879	22 1 3.6	16.68
11	7 49 59.32	6.883	22 0 38.0	16.73	11 22 27.0	7 52 33.66	6.861	21 54 18.4	17.08
12	7 52 44.31	6.866	21 53 51.9	17.12	12 22 25.8	7 55 18.12	6.844	21 47 23.8	17.47
13	7 55 28.88	6.848	21 46 56.3	17.51	13 22 24.6	7 58 2.15	6.826	21 40 19.8	17.86
14	7 58 13.02	6.830	21 39 51.4	17.90	14 22 23.4	8 0 45.76	6.808	21 33 6.5	18.24
15	8 0 56.73	6.812	21 32 37.1	18.28	15 22 22.2	8 3 26.93	6.790	21 25 44.1	18.62
16	8 3 40.01	6.794	21 25 13.7	18.66	16 22 20.9	8 6 11.67	6.772	21 18 12.7	19.00
17	8 6 22.85	6.776	21 17 41.3	19.04	17 22 19.7	8 8 53.97	6.753	21 10 32.3	19.37
18	8 9 5.26	6.758	21 9 59.9	19.41	18 22 18.5	8 11 35.83	6.735	21 2 43.1	19.74
19	8 11 47.24	6.740	21 2 9.6	19.78	19 22 17.2	8 14 17.27	6.718	20 54 45.1	20.10
20	8 14 28.79	6.722	20 54 10.6	20.14	20 22 16.0	8 16 58.28	6.700	20 46 38.5	20.45
21	8 17 9.90	6.704	20 46 3.0	20.50	21 22 14.7	8 19 38.85	6.681	20 38 23.5	20.80
22	8 19 50.58	6.686	20 37 46.9	20.85	22 22 13.4	8 22 18.98	6.663	20 30 0.0	21.15
23	8 22 30.83	6.668	20 29 22.4	21.19	23 22 12.1	8 24 58.68	6.645	20 21 28.2	21.49
24	8 25 10.64	6.649	20 20 49.5	21.54	24 22 10.9	8 27 37.95	6.627	20 12 48.3	21.83
25	8 27 50.01	6.631	20 12 8.5	21.88	25 22 9.6	8 30 16.78	6.609	20 4 0.2	22.17
26	8 30 28.95	6.613	20 3 19.4	22.21	26 22 8.3	8 32 55.17	6.591	19 55 4.2	22.50
27	8 33 7.46	6.595	19 54 22.3	22.54	27 22 7.0	8 35 33.13	6.572	19 46 0.4	22.82
28	8 35 45.52	6.577	19 45 17.3	22.87	28 22 5.7	8 38 10.65	6.554	19 36 48.8	23.14
29	8 38 23.14	6.558	19 36 4.6	23.19	29 22 4.3	8 40 47.72	6.535	19 27 29.6	23.46
30	8 41 0.32	6.540	19 26 44.3	23.51	30 22 3.0	8 43 24.34	6.517	19 18 2.9	23.77
31	8 43 37.05	6.521	19 17 16.5	23.82	31 22 1.7	8 46 0.52	6.498	19 8 28.8	24.07



Date. 1872.	FOR WASHINGTON MEAN NOON.				FOR MERIDIAN TRANSIT.				
	Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Mean Time of Transit.	Apparent Right Ascension.	Diff. for 1 h. of Long.	Apparent Declination.	Diff. for 1 hour of Long.
Sept. 1	h m s 8 46 13.34	+6.503	+19° 7' 41".3	-24'.12	d h m 1 22 0.3	h m s 8 48 36.25	+6.479	+18° 58' 47".4	-24'.37
2	8 48 49.18	6.484	18 57 58.7	24.42	2 21 59.0	8 51 11.53	6.460	18 48 59.0	24.66
3	8 51 24.57	6.465	18 48 9.1	24.71	3 21 57.6	8 53 46.35	6.441	18 39 3.6	24.95
4	8 53 59.50	6.446	18 38 12.6	25.00	4 21 56.2	8 56 20.72	6.423	18 29 1.3	25.24
5	8 56 33.98	6.427	18 28 9.2	25.29	5 21 54.9	8 58 54.64	6.404	18 18 52.2	25.52
6	8 59 8.01	6.408	18 17 58.9	25.57	6 21 53.5	9 1 28.11	6.385	18 8 36.5	25.79
7	9 1 41.58	6.390	18 7 42.0	25.85	7 21 52.1	9 4 1.12	6.366	17 58 14.2	26.06
8	9 4 14.70	6.371	17 57 18.5	26.12	8 21 50.7	9 6 33.68	6.347	17 47 45.5	26.32
9	9 6 47.37	6.352	17 46 48.6	26.38	9 21 49.3	9 9 5.79	6.329	17 37 10.6	26.58
10	9 9 19.59	6.333	17 36 12.6	26.64	10 21 47.9	9 11 37.46	6.310	17 26 29.5	26.84
11	9 11 51.36	6.314	17 25 30.3	26.89	11 21 46.5	9 14 8.68	6.292	17 15 42.3	27.09
12	9 14 22.69	6.296	17 14 41.9	27.14	12 21 45.0	9 16 39.46	6.274	17 4 49.1	27.34
13	9 16 53.59	6.278	17 3 47.5	27.39	13 21 43.6	9 19 9.81	6.256	16 53 50.1	27.58
14	9 19 24.05	6.260	16 52 47.3	27.63	14 21 42.2	9 21 39.73	6.238	16 42 45.4	27.81
15	9 21 54.07	6.242	16 41 41.4	27.87	15 21 40.7	9 24 9.22	6.220	16 31 35.1	28.04
16	9 24 23.67	6.224	16 30 29.9	28.10	16 21 39.3	9 26 38.28	6.202	16 20 19.3	28.27
17	9 26 52.84	6.206	16 19 12.8	28.33	17 21 37.8	9 29 6.92	6.184	16 8 58.0	28.50
18	9 29 21.59	6.189	16 7 50.3	28.55	18 21 36.3	9 31 35.13	6.167	15 57 31.4	28.72
19	9 31 49.01	6.171	15 56 22.5	28.77	19 21 34.9	9 34 2.93	6.150	15 45 59.6	28.93
20	9 34 17.82	6.154	15 44 49.5	28.98	20 21 33.4	9 36 30.32	6.133	15 34 22.8	29.14
21	9 36 45.32	6.137	15 33 11.5	29.19	21 21 31.9	9 38 57.31	6.116	15 22 41.1	29.34
22	9 39 12.42	6.120	15 21 28.5	29.39	22 21 30.4	9 41 23.88	6.098	15 10 54.5	29.54
23	9 41 39.10	6.103	15 9 40.7	29.59	23 21 28.9	9 43 50.03	6.081	14 59 3.0	29.74
24	9 44 5.36	6.086	14 57 48.0	29.79	24 21 27.4	9 46 15.79	6.065	14 47 6.9	29.93
25	9 46 31.23	6.069	14 45 50.7	29.98	25 21 25.9	9 48 41.14	6.048	14 35 6.3	30.12
26	9 48 56.69	6.052	14 33 48.8	30.17	26 21 24.4	9 51 6.08	6.031	14 23 1.3	30.30
27	9 51 21.74	6.036	14 21 42.6	30.35	27 21 22.8	9 53 30.63	6.015	14 10 52.0	30.48
28	9 53 46.40	6.019	14 9 32.0	30.53	28 21 21.3	9 55 54.78	5.998	13 58 38.5	30.65
29	9 56 10.66	6.002	13 57 17.3	30.70	29 21 19.7	9 58 18.53	5.981	13 46 21.0	30.81
30	9 58 34.52	5.985	13 44 58.6	30.86	30 21 18.2	10 0 41.88	5.965	13 33 59.6	30.97
Oct. 1	10 0 57.98	5.968	13 32 36.0	31.02	1 21 16.6	10 3 4.83	5.948	13 21 34.4	31.13
2	10 3 21.04	5.952	13 20 9.5	31.18	2 21 15.1	10 5 27.39	5.932	13 9 5.5	31.28
3	10 5 43.71	5.937	13 7 39.4	31.33	3 21 13.5	10 7 49.56	5.915	12 56 33.0	31.43
4	10 8 5.99	5.921	12 55 5.7	31.48	4 21 11.9	10 10 11.33	5.899	12 43 57.1	31.57
5	10 10 27.87	5.904	12 42 28.6	31.62	5 21 10.4	10 12 32.71	5.883	12 31 17.8	31.70
6	10 12 49.36	5.888	12 29 48.1	31.76	6 21 8.8	10 14 53.71	5.867	12 18 35.4	31.83
7	10 15 10.47	5.872	12 17 4.4	31.89	7 21 7.2	10 17 14.32	5.851	12 5 49.8	31.96
8	10 17 31.19	5.856	12 4 17.6	32.02	8 21 5.6	10 19 34.54	5.835	11 53 1.3	32.08
9	10 19 51.53	5.840	11 51 27.9	32.14	9 21 4.0	10 21 54.39	5.819	11 40 9.9	32.20
10	10 22 11.49	5.824	11 38 35.3	32.25	10 21 2.4	10 24 13.87	5.804	11 27 15.6	32.32
11	10 24 31.08	5.808	11 25 39.8	32.36	11 21 0.7	10 26 32.98	5.789	11 14 18.6	32.43
12	10 26 50.30	5.793	11 12 41.6	32.47	12 20 59.1	10 28 51.73	5.774	11 1 19.2	32.53
13	10 29 9.15	5.778	10 59 41.0	32.58	13 20 57.5	10 31 10.12	5.759	10 48 17.4	32.63
14	10 31 27.65	5.764	10 46 38.0	32.68	14 20 55.8	10 33 28.15	5.744	10 35 13.1	32.73
15	10 33 45.80	5.749	10 33 32.5	32.78	15 20 54.2	10 35 45.84	5.730	10 22 6.5	32.82
16	10 36 3.60	5.735	10 20 24.7	32.87	16 20 52.5	10 38 3.19	5.716	10 8 57.6	32.91
17	10 38 21.06	5.720	10 7 14.7	32.96	17 20 50.9	10 40 20.19	5.701	9 55 46.7	33.00
18	10 40 38.18	5.706	9 54 2.6	33.05	18 20 49.2	10 42 36.86	5.687	9 42 35.8	33.08
19	10 42 54.96	5.692	9 40 48.5	33.13	19 20 47.6	10 44 53.19	5.674	9 29 18.9	33.16
20	10 45 11.40	5.678	9 27 32.5	33.21	20 20 45.9	10 47 9.20	5.660	9 16 2.2	33.23
21	10 47 27.52	5.664	9 14 14.6	33.28	21 20 44.2	10 49 24.88	5.647	9 2 43.9	33.30
22	10 49 43.32	5.651	9 0 55.1	33.34	22 20 42.5	10 51 40.24	5.633	8 49 24.0	33.36
23	10 51 58.80	5.637	8 47 34.0	33.41	23 20 40.8	10 53 55.27	5.620	8 36 4.5	33.42
24	10 54 13.95	5.624	8 34 11.4	33.47	24 20 39.2	10 56 9.98	5.606	8 22 39.7	33.48
25	10 56 28.77	5.610	8 20 47.5	33.52	25 20 37.5	10 58 24.37	5.593	8 9 15.6	33.53
26	10 58 43.27	5.597	8 7 22.3	33.57	26 20 35.8	11 0 38.43	5.579	7 55 50.3	33.57
27	11 0 57.44	5.584	7 53 55.9	33.62	27 20 34.0	11 2 52.16	5.566	7 42 24.1	33.61
28	11 3 11.29	5.571	7 40 28.6	33.66	28 20 32.3	11 5 5.59	5.553	7 28 57.0	33.65
29	11 5 24.83	5.558	7 27 0.4	33.70	29 20 30.6	11 7 18.71	5.540	7 15 29.1	33.68
30	11 7 38.06	5.544	7 13 31.4	33.73	30 20 28.9	11 9 31.50	5.526	7 2 0.4	33.71
31	11 9 50.97	5.530	7 0 1.6	33.75	31 20 27.2	11 11 43.97	5.513	6 48 31.1	33.73
32	11 12 3.55	+5.517	+6 46 31.3	-33.77	32 20 25.4	11 13 56.12	+5.500	+6 35 1.5	-33.74

	FOR WASHINGTON MEAN NOON.					FOR MERIDIAN TRANSIT.				
Date.	Apparent Right Ascension.	Diff. for 1 hour	Apparent Declination.	Diff. for 1 hour.	Mean Time of Transit.	Apparent Right Ascension.	Diff. for 1 h. of Long.	Apparent Declination.	Diff. for 1 hour of Long.	
1872.										
Nov. 1	h m s 11 12 3.55	+5.517	+ 6 46 31.3	-33.77	d h m 1 20 25.4	h m s 11 13 56.12	+5.500	+ 6 35 1.5	-33.74	
2	11 14 15.81	5.504	6 33 0.6	33.79	2 20 23.7	11 16 7.95	5.487	6 21 31.5	33.76	
3	11 16 27.75	5.491	6 19 29.6	33.80	3 20 21.9	11 18 19.47	5.474	6 8 1.2	33.77	
4	11 18 39.39	5.478	6 5 58.4	33.81	4 20 20.2	11 20 30.68	5.461	5 54 30.8	33.77	
5	11 20 50.71	5.465	5 52 27.0	33.81	5 20 18.4	11 22 41.59	5.448	5 41 0.4	33.77	
6	11 23 1.73	5.453	5 38 55.6	33.81	6 20 16.7	11 24 52.19	5.435	5 27 30.1	33.76	
7	11 25 12.44	5.440	5 25 24.3	33.80	7 20 14.9	11 27 2.48	5.422	5 13 59.9	33.75	
8	11 27 22.84	5.427	5 11 53.1	33.80	8 20 13.1	11 29 12.46	5.410	5 0 29.9	33.74	
9	11 29 32.94	5.414	4 58 22.2	33.79	9 20 11.3	11 31 22.15	5.398	4 47 0.3	33.72	
10	11 31 42.75	5.402	4 44 51.6	33.77	10 20 9.6	11 33 31.55	5.386	4 33 31.2	33.70	
11	11 33 52.26	5.390	4 31 21.5	33.75	11 20 7.8	11 35 40.66	5.374	4 20 2.5	33.68	
12	11 36 1.47	5.378	4 17 52.0	33.72	12 20 6.0	11 37 49.48	5.362	4 6 34.4	33.66	
13	11 38 10.41	5.366	4 4 23.0	33.69	13 20 4.2	11 39 58.01	5.350	3 53 7.0	33.63	
14	11 40 19.06	5.354	3 50 54.7	33.66	14 20 2.4	11 42 6.27	5.338	3 39 40.3	33.59	
15	11 42 27.43	5.343	3 37 27.1	33.63	15 20 0.6	11 44 14.25	5.326	3 26 14.5	33.56	
16	11 44 35.52	5.332	3 24 0.5	33.59	16 19 58.8	11 46 21.94	5.315	3 12 49.6	33.52	
17	11 46 43.33	5.320	3 10 34.8	33.55	17 19 57.0	11 48 29.36	5.303	2 59 25.8	33.47	
18	11 48 50.86	5.309	2 57 10.1	33.51	18 19 55.1	11 50 36.50	5.292	2 46 3.1	33.42	
19	11 50 58.11	5.297	2 43 46.5	33.46	19 19 53.3	11 52 43.36	5.280	2 32 41.6	33.37	
20	11 53 5.09	5.286	2 30 24.3	33.41	20 19 51.5	11 54 49.95	5.269	2 19 21.5	33.31	
21	11 55 11.79	5.274	2 17 3.4	33.35	21 19 49.7	11 56 56.26	5.257	2 6 2.8	33.25	
22	11 57 18.21	5.262	2 3 43.9	33.29	22 19 47.8	11 59 2.29	5.245	1 52 45.5	33.19	
23	11 59 24.36	5.250	1 50 25.8	33.22	23 19 46.0	12 1 8.04	5.234	1 39 29.9	33.12	
24	12 1 30.22	5.238	1 37 9.5	33.15	24 19 44.1	12 3 13.51	5.222	1 26 16.0	33.04	
25	12 3 35.80	5.226	1 23 55.0	33.07	25 19 42.3	12 5 18.69	5.210	1 13 4.0	32.96	
26	12 5 41.09	5.214	1 10 42.3	32.99	26 19 40.4	12 7 23.59	5.198	0 59 54.0	32.87	
27	12 7 46.10	5.202	0 57 31.7	32.90	27 19 38.6	12 9 28.19	5.185	0 46 46.1	32.78	
28	12 9 50.81	5.190	0 44 23.2	32.81	28 19 36.7	12 11 32.49	5.173	0 33 40.5	32.69	
29	12 11 55.21	5.177	0 31 16.9	32.72	29 19 34.8	12 13 36.49	5.160	0 20 37.1	32.59	
30	12 13 59.32	5.165	0 18 12.9	32.62	30 19 33.0	12 15 40.19	5.148	+ 0 7 36.1	32.49	
Dec. 1	12 16 3.12	5.152	+ 0 5 11.3	32.52	1 19 31.1	12 17 43.59	5.135	- 0 5 22.5	32.38	
2	12 18 6.62	5.139	- 0 7 47.8	32.41	2 19 29.2	12 19 46.68	5.122	0 18 18.4	32.27	
3	12 20 9.82	5.126	0 20 44.3	32.30	3 19 27.3	12 21 49.46	5.110	0 31 11.6	32.16	
4	12 22 12.71	5.114	0 33 37.9	32.18	4 19 25.4	12 23 51.94	5.097	0 44 2.0	32.04	
5	12 24 15.29	5.101	0 46 28.7	32.06	5 19 23.5	12 25 54.11	5.084	0 56 49.5	31.92	
6	12 26 17.57	5.088	0 59 16.7	31.94	6 19 21.6	12 27 55.98	5.071	1 9 34.1	31.79	
7	12 28 19.54	5.075	1 12 1.8	31.81	7 19 19.7	12 29 57.54	5.058	1 22 15.6	31.67	
8	12 30 21.19	5.062	1 24 43.7	31.68	8 19 17.8	12 31 58.78	5.045	1 34 54.1	31.54	
9	12 32 22.53	5.049	1 37 22.5	31.55	9 19 15.8	12 33 59.71	5.032	1 47 29.4	31.40	
10	12 34 23.57	5.036	1 49 58.2	31.42	10 19 13.9	12 36 0.32	5.019	2 0 1.4	31.26	
11	12 36 24.28	5.023	2 2 30.5	31.28	11 19 12.0	12 38 0.61	5.006	2 12 30.0	31.12	
12	12 38 24.67	5.010	2 14 59.5	31.14	12 19 10.1	12 40 0.59	4.992	2 24 55.2	30.98	
13	12 40 24.74	4.996	2 27 25.1	31.00	13 19 8.1	12 42 0.25	4.979	2 37 17.0	30.83	
14	12 42 24.51	4.983	2 39 47.1	30.85	14 19 6.2	12 43 59.60	4.966	2 49 35.2	30.68	
15	12 44 23.95	4.970	2 52 5.6	30.70	15 19 4.2	12 45 58.62	4.952	3 1 49.8	30.53	
16	12 46 23.06	4.957	3 4 20.4	30.55	16 19 2.2	12 47 57.31	4.938	3 14 0.7	30.37	
17	12 48 21.84	4.943	3 16 31.5	30.39	17 19 0.3	12 49 55.67	4.924	3 26 7.7	30.21	
18	12 50 20.29	4.929	3 28 38.7	30.22	18 18 58.3	12 51 53.68	4.910	3 38 10.9	30.05	
19	12 52 18.39	4.914	3 40 42.1	30.05	19 18 56.3	12 53 51.34	4.896	3 50 10.1	29.88	
20	12 54 16.14	4.899	3 52 41.4	29.88	20 18 54.4	12 55 48.66	4.881	4 2 5.2	29.71	
21	12 56 13.54	4.884	4 4 36.6	29.71	21 18 52.4	12 57 45.61	4.865	4 13 56.1	29.53	
22	12 58 10.58	4.869	4 16 27.6	29.53	22 18 50.4	12 59 42.18	4.849	4 25 42.7	29.35	
23	13 0 7.24	4.853	4 28 14.3	29.35	23 18 48.4	13 1 38.38	4.833	4 37 24.9	29.16	
24	13 2 3.52	4.837	4 39 56.5	29.17	24 18 46.4	13 3 34.19	4.817	4 49 2.6	28.97	
25	13 3 59.40	4.820	4 51 34.1	28.98	25 18 44.3	13 5 29.59	4.800	5 0 35.6	28.78	
26	13 5 54.87	4.803	5 3 7.1	28.78	26 18 42.3	13 7 24.58	4.783	5 12 4.0	28.58	
27	13 7 49.93	4.785	5 14 35.4	28.58	27 18 40.3	13 9 19.16	4.765	5 23 27.5	28.38	
28	13 9 44.57	4.768	5 25 58.8	28.38	28 18 38.3	13 11 13.31	4.747	5 34 46.2	28.18	
29	13 11 38.79	4.750	5 37 17.3	28.17	29 18 36.2	13 13 7.02	4.729	5 45 59.9	27.97	
30	13 13 32.56	4.731	5 48 30.8	27.95	30 18 34.2	13 15 0.28	4.710	5 57 8.5	27.75	
31	13 15 25.87	4.712	5 59 39.2	27.74	31 18 32.1	13 16 53.08	4.690	6 8 12.0	27.54	
32	13 17 18.73	+4.693	- 6 10 42.5	-27.52	32 18 30.1	13 18 45.42	+4.671	- 6 19 10.2	-27.32	

Date. 1872.	FOR WASHINGTON MEAN NOON.				FOR MERIDIAN TRANSIT.				
	Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Mean Time of Transit.	Apparent Right Ascension.	Diff. for 1 h. of Long.	Apparent Declination.	Diff. for 1 hour of Long.
Jan. 0	h m s 7 55 51.16	-1.294	+21 11 56.8	+ 3.97	d h m 0 13 14.7	h m s 7 55 33.93	-1.300	+21 12 49.4	+ 3.97
1	7 55 19.89	1.310	21 13 32.3	4.00	1 13 10.2	7 55 25.55	1.315	21 14 25.0	3.99
2	7 54 48.26	1.325	21 15 8.3	4.02	2 13 5.8	7 54 30.84	1.328	21 16 0.9	4.00
3	7 54 16.29	1.339	21 16 44.7	4.03	3 13 1.3	7 53 58.90	1.341	21 17 37.2	4.02
4	7 53 44.01	1.352	21 18 21.4	4.04	4 12 56.8	7 53 26.47	1.353	21 19 13.7	4.03
5	7 53 11.43	1.364	21 19 58.4	4.05	5 12 52.3	7 52 53.85	1.365	21 20 50.5	4.04
6	7 52 38.58	1.375	21 21 35.6	4.05	6 12 47.9	7 52 20.97	1.375	21 22 27.5	4.04
7	7 52 5.49	1.384	21 23 12.8	4.05	7 12 43.4	7 51 47.87	1.384	21 24 4.4	4.04
8	7 51 32.19	1.392	21 24 50.0	4.05	8 12 38.9	7 51 14.57	1.392	21 25 41.3	4.04
9	7 50 58.70	1.399	21 26 27.2	4.05	9 12 34.4	7 50 41.09	1.399	21 27 18.1	4.03
10	7 50 25.04	1.405	21 28 4.4	4.05	10 12 29.9	7 50 7.76	1.405	21 28 54.9	4.03
11	7 49 51.24	1.410	21 29 41.4	4.04	11 12 25.4	7 49 33.70	1.409	21 30 31.5	4.02
12	7 49 17.32	1.414	21 31 18.1	4.03	12 12 20.9	7 48 59.84	1.412	21 32 7.7	4.00
13	7 48 43.32	1.417	21 32 54.5	4.01	13 12 16.4	7 48 25.91	1.414	21 33 43.6	3.98
14	7 48 9.27	1.419	21 34 30.4	3.99	14 12 11.9	7 47 51.95	1.415	21 35 19.0	3.96
15	7 47 35.19	1.420	21 36 5.8	3.97	15 12 7.4	7 47 17.98	1.415	21 36 53.8	3.93
16	7 47 1.11	1.420	21 37 40.7	3.94	16 12 2.9	7 46 44.02	1.414	21 38 28.1	3.91
17	7 46 27.05	1.418	21 39 14.9	3.91	17 11 58.4	7 46 10.09	1.412	21 40 1.7	3.88
18	7 45 53.04	1.415	21 40 48.4	3.88	18 11 53.9	7 45 36.23	1.409	21 41 34.5	3.85
19	7 45 19.10	1.411	21 42 21.2	3.85	19 11 49.4	7 45 2.45	1.405	21 43 6.6	3.82
20	7 44 45.26	1.406	21 43 53.2	3.81	20 11 44.9	7 44 18.78	1.400	21 44 37.9	3.78
21	7 44 11.54	1.400	21 45 24.3	3.77	21 11 40.4	7 43 55.23	1.394	21 46 8.3	3.74
22	7 43 37.98	1.393	21 46 54.4	3.73	22 11 35.9	7 43 21.85	1.386	21 47 37.6	3.70
23	7 43 4.60	1.386	21 48 23.5	3.69	23 11 31.4	7 42 48.66	1.398	21 49 5.9	3.66
24	7 42 31.41	1.377	21 49 51.5	3.64	24 11 26.9	7 42 15.67	1.369	21 50 33.1	3.61
25	7 41 58.45	1.367	21 51 18.4	3.60	25 11 22.5	7 41 42.92	1.359	21 51 59.2	3.56
26	7 41 25.73	1.356	21 52 44.1	3.55	26 11 18.0	7 41 10.42	1.348	21 53 24.1	3.51
27	7 40 53.28	1.345	21 54 8.6	3.50	27 11 13.6	7 40 38.20	1.336	21 54 47.8	3.46
28	7 40 21.13	1.333	21 55 31.9	3.44	28 11 9.1	7 40 6.29	1.323	21 56 10.2	3.41
29	7 39 49.29	1.320	21 56 53.9	3.39	29 11 4.7	7 39 34.70	1.309	21 57 31.3	3.36
30	7 39 17.79	1.305	21 58 14.6	3.33	30 11 0.2	7 39 3.46	1.294	21 58 51.2	3.30
Feb. 1	7 38 46.65	1.289	21 59 33.9	3.27	31 10 55.8	7 38 32.59	1.278	22 0 9.6	3.24
2	7 38 15.89	1.272	22 0 51.8	3.21	1 10 51.4	7 38 2.11	1.261	22 1 26.6	3.18
3	7 37 45.54	1.255	22 2 8.2	3.15	2 10 47.0	7 37 32.14	1.243	22 2 42.1	3.12
4	7 37 15.62	1.237	22 3 23.1	3.09	3 10 42.5	7 37 2.42	1.224	22 3 56.1	3.06
5	7 36 46.15	1.218	22 4 36.4	3.03	4 10 38.1	7 36 33.25	1.205	22 5 8.5	2.99
6	7 36 17.15	1.198	22 5 48.2	2.96	5 10 33.7	7 36 4.55	1.185	22 6 19.4	2.92
7	7 35 48.64	1.177	22 6 58.4	2.90	6 10 29.3	7 35 36.35	1.164	22 7 28.6	2.85
8	7 35 20.65	1.155	22 8 7.0	2.83	7 10 24.9	7 35 8.67	1.142	22 8 36.3	2.78
9	7 34 53.20	1.132	22 9 14.0	2.76	8 10 20.5	7 34 41.54	1.119	22 9 42.4	2.71
10	7 34 26.31	1.108	22 10 19.3	2.69	9 10 16.1	7 34 14.97	1.095	22 10 46.8	2.64
11	7 33 59.99	1.084	22 11 22.9	2.62	10 10 11.8	7 33 48.98	1.071	22 11 49.4	2.57
12	7 33 34.26	1.059	22 12 24.8	2.54	11 10 7.4	7 33 23.58	1.046	22 12 50.4	2.50
13	7 33 9.15	1.033	22 13 24.9	2.47	12 10 3.1	7 32 58.81	1.020	22 13 49.6	2.43
14	7 32 44.67	1.007	22 14 23.3	2.40	13 9 58.8	7 32 34.67	0.993	22 14 47.1	2.36
15	7 32 20.82	0.980	22 15 19.9	2.33	14 9 54.5	7 32 11.16	0.966	22 15 42.8	2.29
16	7 31 57.63	0.952	22 16 14.7	2.25	15 9 50.2	7 31 48.32	0.938	22 16 36.7	2.22
17	7 31 35.12	0.924	22 17 7.7	2.18	16 9 45.9	7 31 26.16	0.910	22 17 28.8	2.14
18	7 31 13.30	0.895	22 17 59.0	2.10	17 9 41.6	7 31 4.69	0.881	22 18 19.2	2.07
19	7 30 52.17	0.865	22 18 48.4	2.03	18 9 37.3	7 30 43.90	0.852	22 19 7.8	2.00
20	7 30 31.75	0.835	22 19 36.0	1.95	19 9 33.0	7 30 23.83	0.822	22 19 54.5	1.92
21	7 30 12.05	0.805	22 20 21.8	1.87	20 9 28.7	7 30 4.48	0.791	22 20 39.5	1.84
22	7 29 53.09	0.774	22 21 5.8	1.80	21 9 24.5	7 29 45.86	0.760	22 21 22.6	1.76
23	7 29 34.87	0.743	22 21 47.9	1.72	22 9 20.3	7 29 27.98	0.729	22 22 3.9	1.68
24	7 29 17.40	0.712	22 22 28.2	1.64	23 9 16.1	7 29 10.86	0.698	22 22 43.3	1.60
25	7 29 0.69	0.680	22 23 6.7	1.57	24 9 11.9	7 28 54.49	0.666	22 23 21.0	1.52
26	7 28 44.74	0.648	22 23 43.3	1.50	25 9 7.7	7 28 38.88	0.634	22 23 56.8	1.45
27	7 28 29.57	0.616	22 24 18.1	1.42	26 9 3.5	7 28 24.05	0.602	22 24 30.8	1.37
28	7 28 15.18	0.583	22 24 51.1	1.34	27 8 59.3	7 28 10.00	0.570	22 25 3.0	1.30
29	7 28 1.57	0.550	22 25 22.2	1.26	28 8 55.1	7 27 56.73	0.537	22 25 33.3	1.22
30	7 27 48.75	0.517	22 25 51.5	1.18	29 8 51.0	7 27 44.24	0.504	22 26 1.8	1.15
31	7 27 36.74	-0.484	22 26 18.9	+ 1.10	30 8 46.9	7 27 32.56	-0.470	22 26 28.5	+ 1.07

Date. 1872.	FOR WASHINGTON MEAN NOON.				FOR MERIDIAN TRANSIT.				
	Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Mean Time of Transit.	Apparent Right Ascension.	Diff. for 1 h. of Long.	Apparent Declination.	Diff. for 1 hour of Long.
Mar. 1	<sup>h</sup> 7 <sup>m</sup> 27 <sup>s</sup> 36.74	-0.484	+22° 26' 18.9"	+ 1.10	<sup>d</sup> 1 <sup>h</sup> 8 <sup>m</sup> 46.9	<sup>h</sup> 7 <sup>m</sup> 27 <sup>s</sup> 32.56	-0.470	+22° 26' 28.5"	+ 1.07
2	7 27 35.54	0.450	22 26 44.5	1.03	2 8 42.8	7 27 21.68	0.436	22 26 53.3	1.00
3	7 27 15.15	0.416	22 27 8.3	0.95	3 8 38.7	7 27 11.61	0.402	22 27 16.4	0.92
4	7 27 5.57	0.382	22 27 30.3	0.88	4 8 34.6	7 27 2.35	0.368	22 27 37.7	0.85
5	7 26 56.82	0.347	22 27 50.5	0.80	5 8 30.5	7 26 53.92	0.334	22 27 57.2	0.77
6	7 26 49.90	0.313	22 28 8.9	0.73	6 8 26.4	7 26 46.31	0.300	22 28 14.9	0.70
7	7 26 41.81	0.278	22 28 25.5	0.65	7 8 22.3	7 26 39.53	0.266	22 28 30.8	0.62
8	7 26 35.55	0.243	22 28 40.2	0.58	8 8 18.3	7 26 33.58	0.231	22 28 44.9	0.55
9	7 26 30.13	0.208	22 28 53.1	0.50	9 8 14.3	7 26 28.46	0.196	22 28 57.1	0.47
10	7 26 25.55	0.173	22 29 4.2	0.43	10 8 10.3	7 26 24.18	0.161	22 29 7.5	0.40
11	7 26 21.81	0.138	22 29 13.5	0.35	11 8 6.3	7 26 20.73	0.126	22 29 16.2	0.33
12	7 26 18.91	0.103	22 29 21.1	0.28	12 8 2.4	7 26 18.12	0.091	22 29 23.2	0.25
13	7 26 16.85	0.068	22 29 26.9	0.20	13 7 58.5	7 26 16.35	0.056	22 29 28.4	0.18
14	7 26 15.63	-0.033	22 29 30.9	0.13	14 7 54.5	7 26 15.41	-0.021	22 29 31.8	0.10
15	7 26 15.25	+0.002	22 29 33.1	+ 0.05	15 7 50.6	7 26 15.31	+0.014	22 29 33.4	+ 0.03
16	7 26 15.71	0.037	22 29 33.5	- 0.02	16 7 46.6	7 26 16.04	0.048	22 29 33.2	- 0.04
17	7 26 17.01	0.071	22 29 32.2	0.09	17 7 42.7	7 26 17.60	0.082	22 29 31.4	0.11
18	7 26 19.13	0.106	22 29 29.1	0.17	18 7 38.8	7 26 19.98	0.116	22 29 27.7	0.19
19	7 26 22.08	0.140	22 29 24.3	0.24	19 7 34.9	7 26 23.18	0.150	22 29 22.4	0.26
20	7 26 25.85	0.174	22 29 17.7	0.31	20 7 31.0	7 26 27.20	0.184	22 29 15.3	0.33
21	7 26 30.44	0.208	22 29 9.4	0.38	21 7 27.2	7 26 32.03	0.218	22 29 6.5	0.40
22	7 26 35.84	0.242	22 28 59.4	0.45	22 7 23.3	7 26 37.67	0.252	22 28 56.0	0.48
23	7 26 42.05	0.276	22 28 47.6	0.53	23 7 19.5	7 26 44.11	0.285	22 28 43.7	0.55
24	7 26 49.07	0.309	22 28 34.1	0.60	24 7 15.7	7 26 51.35	0.318	22 28 29.7	0.62
25	7 26 56.88	0.342	22 28 18.9	0.67	25 7 11.9	7 26 59.38	0.351	22 28 14.0	0.69
26	7 27 5.49	0.375	22 28 2.0	0.74	26 7 8.1	7 27 8.20	0.384	22 27 56.6	0.76
27	7 27 14.89	0.408	22 27 43.4	0.81	27 7 4.3	7 27 17.81	0.417	22 27 37.6	0.83
28	7 27 25.07	0.441	22 27 23.1	0.88	28 7 0.6	7 27 28.19	0.449	22 27 16.8	0.90
29	7 27 36.04	0.473	22 27 1.1	0.95	29 6 56.9	7 27 39.35	0.481	22 26 54.4	0.97
30	7 27 47.78	0.505	22 26 37.4	1.02	30 6 53.2	7 27 51.28	0.513	22 26 30.2	1.04
31	7 28 0.29	0.537	22 26 12.0	1.09	31 6 49.5	7 28 3.98	0.545	22 26 4.4	1.11
Apr. 1	7 28 13.57	0.569	22 25 44.9	1.16	1 6 45.8	7 28 17.44	0.577	22 25 36.9	1.18
2	7 28 27.62	0.601	22 25 16.1	1.23	2 6 42.1	7 28 31.67	0.608	22 25 7.7	1.25
3	7 28 42.42	0.633	22 24 45.6	1.30	3 6 38.4	7 28 46.66	0.639	22 24 36.8	1.32
4	7 28 57.97	0.664	22 24 13.4	1.37	4 6 34.7	7 29 2.36	0.670	22 24 4.2	1.39
5	7 29 14.27	0.695	22 23 39.6	1.44	5 6 31.0	7 29 18.82	0.701	22 23 30.0	1.46
6	7 29 31.31	0.725	22 23 4.1	1.51	6 6 27.4	7 29 36.02	0.731	22 23 54.2	1.53
7	7 29 49.07	0.755	22 22 26.9	1.59	7 6 23.7	7 29 53.93	0.761	22 22 16.6	1.60
8	7 30 7.57	0.785	22 21 48.0	1.66	8 6 20.1	7 30 12.57	0.791	22 21 37.3	1.67
9	7 30 26.79	0.815	22 21 7.4	1.73	9 6 16.5	7 30 31.93	0.821	22 20 56.4	1.74
10	7 30 46.72	0.845	22 20 25.1	1.80	10 6 12.9	7 30 51.99	0.850	22 20 13.8	1.81
11	7 31 7.35	0.874	22 19 41.1	1.87	11 6 9.3	7 31 12.75	0.879	22 19 29.5	1.88
12	7 31 28.68	0.903	22 18 55.4	1.94	12 6 5.7	7 31 34.20	0.908	22 18 43.5	1.95
13	7 31 50.70	0.931	22 18 8.1	2.01	13 6 2.1	7 31 56.34	0.936	22 17 55.9	2.02
14	7 32 13.39	0.959	22 17 19.1	2.08	14 5 58.6	7 32 19.14	0.964	22 17 6.6	2.09
15	7 32 36.75	0.987	22 16 28.4	2.15	15 5 55.0	7 32 42.61	0.991	22 16 15.6	2.16
16	7 33 0.78	1.015	22 15 36.0	2.22	16 5 51.4	7 33 6.74	1.018	22 15 23.0	2.23
17	7 33 25.46	1.042	22 14 42.0	2.29	17 5 47.9	7 33 31.52	1.045	22 14 28.7	2.30
18	7 33 50.78	1.069	22 13 46.3	2.36	18 5 44.4	7 33 56.93	1.072	22 13 32.8	2.37
19	7 34 16.74	1.095	22 12 48.9	2.43	19 5 40.9	7 34 22.98	1.098	22 12 35.1	2.44
20	7 34 43.32	1.121	22 11 49.8	2.50	20 5 37.4	7 34 49.64	1.124	22 11 35.8	2.51
21	7 35 10.52	1.146	22 10 49.0	2.57	21 5 34.0	7 35 16.92	1.149	22 10 34.8	2.58
22	7 35 38.33	1.171	22 9 46.6	2.64	22 5 30.6	7 35 44.80	1.174	22 9 32.1	2.65
23	7 36 6.74	1.196	22 8 42.5	2.71	23 5 27.1	7 36 13.28	1.199	22 8 27.7	2.72
24	7 36 35.74	1.221	22 7 36.7	2.78	24 5 23.7	7 36 42.34	1.223	22 7 21.7	2.79
25	7 37 5.33	1.245	22 6 29.3	2.85	25 5 20.3	7 37 11.99	1.247	22 6 14.1	2.85
26	7 37 35.50	1.269	22 5 20.2	2.92	26 5 16.9	7 37 42.21	1.271	22 5 4.8	2.92
27	7 38 6.24	1.293	22 4 9.5	2.99	27 5 13.5	7 38 13.00	1.295	22 3 53.9	2.99
28	7 38 37.54	1.316	22 2 57.1	3.06	28 5 10.1	7 38 44.34	1.318	22 2 41.3	3.06
29	7 39 9.40	1.339	22 1 42.9	3.13	29 5 6.7	7 39 16.24	1.341	22 1 26.9	3.13
30	7 39 41.81	1.362	22 0 27.0	3.20	30 5 3.3	7 39 48.69	1.364	22 0 10.9	3.20
31	7 40 14.77	+1.384	+21 59 9.5	- 3.27	31 4 59.9	7 40 21.69	+1.386	+21 58 53.2	- 3.27

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	Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Mean Time of Transit.	Apparent Right Ascension.	Diff. for 1 h. of Long.	Apparent Declination.	Diff. for 1 hour of Long.
May 1	h m s 7 40 14.77	+1.384	+21 59 9.5	- 3.27	d h m 1 4 59.9	h m s 7 40 21.69	+1.386	+21 58 53.2	- 3.27
2	7 40 48.27	1.406	21 57 50.3	3.34	2 4 56.5	7 40 55.22	1.408	21 57 33.9	3.34
3	7 41 22.29	1.428	21 56 29.5	3.41	3 4 53.1	7 41 29.27	1.430	21 56 12.9	3.41
4	7 41 56.83	1.450	21 55 6.9	3.48	4 4 49.8	7 42 3.84	1.451	21 54 50.2	3.48
5	7 42 31.89	1.471	21 53 42.6	3.55	5 4 46.4	7 42 38.92	1.472	21 53 24.7	3.55
6	7 43 7.46	1.492	21 52 16.6	3.62	6 4 43.0	7 43 14.51	1.493	21 51 59.6	3.62
7	7 43 43.52	1.513	21 50 49.0	3.69	7 4 39.7	7 43 50.58	1.513	21 50 31.8	3.69
8	7 44 20.07	1.533	21 49 19.7	3.76	8 4 36.4	7 44 27.14	1.533	21 49 2.4	3.76
9	7 44 57.10	1.553	21 47 48.7	3.83	9 4 33.1	7 45 4.17	1.553	21 47 31.3	3.83
10	7 45 34.60	1.572	21 46 16.0	3.90	10 4 29.8	7 45 41.67	1.572	21 45 58.5	3.90
11	7 46 12.57	1.591	21 44 41.6	3.97	11 4 26.5	7 46 19.64	1.591	21 44 24.0	3.97
12	7 46 50.99	1.610	21 43 5.5	4.04	12 4 23.2	7 46 58.06	1.610	21 42 47.8	4.04
13	7 47 29.86	1.628	21 41 27.7	4.11	13 4 19.9	7 47 36.92	1.628	21 41 9.9	4.11
14	7 48 9.17	1.646	21 39 48.2	4.18	14 4 16.6	7 48 16.22	1.646	21 39 30.3	4.18
15	7 48 48.90	1.664	21 38 7.0	4.25	15 4 13.3	7 48 55.94	1.664	21 37 49.0	4.25
16	7 49 29.06	1.681	21 36 24.1	4.32	16 4 10.1	7 49 36.08	1.681	21 36 6.1	4.32
17	7 50 9.63	1.698	21 34 39.6	4.39	17 4 6.8	7 50 16.63	1.698	21 34 21.5	4.39
18	7 50 50.60	1.715	21 32 53.4	4.46	18 4 3.5	7 50 57.57	1.714	21 32 35.3	4.46
19	7 51 31.97	1.732	21 31 5.5	4.53	19 4 0.2	7 51 38.91	1.730	21 30 47.4	4.53
20	7 52 13.73	1.748	21 29 15.9	4.60	20 3 57.0	7 52 20.64	1.746	21 28 57.8	4.60
21	7 52 55.88	1.764	21 27 24.7	4.67	21 3 53.7	7 53 2.76	1.762	21 27 6.5	4.67
22	7 53 38.40	1.780	21 25 31.8	4.74	22 3 50.5	7 53 45.24	1.777	21 25 13.6	4.74
23	7 54 21.29	1.795	21 23 37.1	4.81	23 3 47.3	7 54 28.09	1.792	21 23 18.9	4.81
24	7 55 4.54	1.810	21 21 40.8	4.88	24 3 44.1	7 55 11.30	1.807	21 21 22.6	4.88
25	7 55 48.14	1.825	21 19 42.9	4.95	25 3 40.9	7 55 54.86	1.822	21 19 24.7	4.95
26	7 56 32.09	1.839	21 17 43.3	5.02	26 3 37.7	7 56 38.77	1.836	21 17 25.1	5.02
27	7 57 16.38	1.853	21 15 42.0	5.09	27 3 34.5	7 57 23.01	1.850	21 15 23.8	5.09
28	7 58 1.01	1.867	21 13 39.1	5.16	28 3 31.4	7 58 7.59	1.864	21 13 20.9	5.16
29	7 58 45.97	1.881	21 11 34.5	5.23	29 3 28.2	7 58 52.50	1.878	21 11 16.4	5.23
30	7 59 31.26	1.894	21 9 28.3	5.30	30 3 25.0	7 59 37.74	1.891	21 9 10.2	5.30
June 1	8 0 16.87	1.907	21 7 20.4	5.37	31 3 21.8	8 0 23.29	1.904	21 7 2.3	5.36
2	8 1 2.79	1.920	21 5 10.8	5.44	1 3 18.7	8 1 9.15	1.917	21 4 52.8	5.43
3	8 1 49.01	1.932	21 2 59.6	5.51	2 3 15.5	8 1 55.31	1.929	21 2 41.6	5.50
4	8 2 35.53	1.944	21 0 46.8	5.58	3 3 12.4	8 2 41.77	1.941	21 0 28.9	5.57
5	8 3 22.34	1.956	20 58 32.3	5.65	4 3 9.2	8 3 28.51	1.953	20 58 14.5	5.64
6	8 4 9.44	1.968	20 56 16.1	5.71	5 3 6.1	8 4 15.54	1.965	20 55 58.4	5.70
7	8 4 56.82	1.980	20 53 58.3	5.78	6 3 2.9	8 5 2.85	1.976	20 53 40.7	5.77
8	8 5 44.47	1.991	20 51 38.9	5.85	7 2 59.8	8 5 50.43	1.987	20 51 21.4	5.84
9	8 6 32.38	2.002	20 49 17.9	5.91	8 2 56.6	8 6 38.27	1.998	20 49 0.5	5.91
10	8 7 20.54	2.013	20 46 55.2	5.98	9 2 53.5	8 7 26.36	2.009	20 46 37.9	5.98
11	8 8 8.96	2.023	20 44 30.9	6.05	10 2 50.3	8 8 14.70	2.019	20 44 13.7	6.04
12	8 8 57.62	2.033	20 42 5.0	6.11	11 2 47.2	8 9 3.28	2.029	20 41 48.0	6.11
13	8 9 46.52	2.043	20 39 37.5	6.18	12 2 44.1	8 9 52.10	2.039	20 39 20.6	6.18
14	8 10 35.64	2.052	20 37 8.4	6.24	13 2 41.0	8 10 41.14	2.048	20 36 51.7	6.24
15	8 11 24.99	2.061	20 34 37.8	6.31	14 2 37.8	8 11 30.41	2.057	20 34 21.2	6.31
16	8 12 14.55	2.069	20 32 5.6	6.37	15 2 34.7	8 12 19.89	2.066	20 31 49.2	6.37
17	8 13 4.31	2.077	20 29 31.8	6.44	16 2 31.6	8 13 9.56	2.074	20 29 15.5	6.44
18	8 13 54.28	2.085	20 26 56.5	6.50	17 2 28.5	8 13 59.44	2.082	20 26 40.4	6.50
19	8 14 44.44	2.093	20 24 19.7	6.57	18 2 25.4	8 14 49.51	2.090	20 24 3.7	6.57
20	8 15 34.79	2.101	20 21 41.4	6.63	19 2 22.3	8 15 39.77	2.098	20 21 25.6	6.63
21	8 16 25.33	2.109	20 19 1.5	6.69	20 2 19.2	8 16 30.22	2.106	20 18 45.9	6.69
22	8 17 16.05	2.117	20 16 20.1	6.76	21 2 16.1	8 17 20.85	2.113	20 16 4.7	6.76
23	8 18 6.95	2.124	20 13 37.2	6.82	22 2 13.0	8 18 11.66	2.120	20 13 22.0	6.82
24	8 18 58.02	2.131	20 10 52.8	6.88	23 2 9.9	8 19 2.64	2.127	20 10 37.8	6.88
25	8 19 49.25	2.138	20 8 6.9	6.95	24 2 6.8	8 19 53.77	2.134	20 7 52.1	6.94
26	8 20 40.64	2.145	20 5 19.5	7.01	25 2 3.8	8 20 45.06	2.140	20 5 5.0	7.00
27	8 21 32.19	2.151	20 2 30.6	7.07	26 2 0.7	8 21 36.51	2.146	20 2 16.3	7.06
28	8 22 23.90	2.157	19 59 40.3	7.13	27 1 57.6	8 22 28.12	2.152	19 59 26.3	7.12
29	8 23 15.75	2.163	19 56 48.5	7.19	28 1 54.5	8 23 19.87	2.158	19 56 34.8	7.18
30	8 24 7.74	2.169	19 53 55.3	7.25	29 1 51.5	8 24 11.76	2.164	19 53 41.8	7.24
31	8 24 59.86	2.174	19 51 0.6	7.31	30 1 48.4	8 25 3.78	2.170	19 50 47.3	7.30
	8 25 52.11	+2.179	+19 48 4.5	- 7.37	31 1 45.4	8 25 55.93	+2.175	+19 47 51.5	- 7.35

Date. 1872.	FOR WASHINGTON MEAN NOON.				FOR MERIDIAN TRANSIT.				
	Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Mean Time of Transit.	Apparent Right Ascension.	Diff. for 1 h. of Long.	Apparent Declination.	Diff. for 1 hour of Long.
	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>	<sup>d</sup> <sup>h</sup> <sup>m</sup>	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>
July 1	8 25 52.11	+2.179	+19 46 4.5	- 7.37	1 1 45.4	8 25 55.93	+2.175	+19 47 51.5	- 7.35
2	8 26 44.48	2.184	19 45 7.0	7.43	2 1 42.3	8 26 48.20	2.180	19 44 54.3	7.41
3	8 27 36.98	2.189	19 42 8.1	7.49	3 1 39.3	8 27 40.60	2.185	19 41 55.7	7.47
4	8 28 29.59	2.194	19 39 7.9	7.55	4 1 36.2	8 28 33.11	2.190	19 38 55.8	7.53
5	8 29 22.31	2.199	19 36 6.3	7.60	5 1 33.1	8 29 25.73	2.194	19 35 54.5	7.59
6	8 30 15.13	2.203	19 33 3.3	7.66	6 1 30.1	8 30 18.44	2.198	19 32 51.8	7.64
7	8 31 8.05	2.207	19 29 59.0	7.72	7 1 27.0	8 31 11.25	2.202	19 29 47.8	7.70
8	8 32 1.06	2.210	19 26 53.4	7.77	8 1 23.9	8 32 4.16	2.206	19 26 42.5	7.76
9	8 32 54.15	2.214	19 23 46.5	7.82	9 1 20.9	8 32 57.14	2.209	19 23 35.9	7.81
10	8 33 47.31	2.217	19 20 38.2	7.87	10 1 17.8	8 33 50.19	2.212	19 20 27.9	7.86
11	8 34 40.54	2.220	19 17 28.7	7.92	11 1 14.8	8 34 43.31	2.215	19 17 18.8	7.91
12	8 35 33.85	2.223	19 14 17.9	7.97	12 1 11.8	8 35 36.51	2.218	19 14 8.3	7.96
13	8 36 27.22	2.225	19 11 5.9	8.02	13 1 8.7	8 36 29.77	2.220	19 10 56.7	8.01
14	8 37 20.64	2.227	19 7 52.7	8.07	14 1 5.7	8 37 23.08	2.222	19 7 43.8	8.06
15	8 38 14.11	2.229	19 4 38.3	8.12	15 1 2.7	8 38 16.44	2.224	19 4 29.8	8.11
16	8 39 7.63	2.231	19 1 22.7	8.17	16 0 59.6	8 39 9.85	2.226	19 1 14.5	8.16
17	8 40 1.20	2.233	18 58 6.0	8.22	17 0 56.6	8 40 3.31	2.228	18 57 58.2	8.21
18	8 40 54.80	2.234	18 54 48.1	8.27	18 0 53.6	8 40 56.80	2.230	18 54 40.7	8.26
19	8 41 48.43	2.235	18 51 29.1	8.32	19 0 50.6	8 41 50.31	2.231	18 51 22.1	8.31
20	8 42 42.09	2.236	18 48 9.0	8.37	20 0 47.5	8 42 43.86	2.232	18 48 2.4	8.35
21	8 43 35.78	2.237	18 44 47.8	8.41	21 0 44.5	8 43 37.44	2.233	18 44 41.6	8.39
22	8 44 29.49	2.238	18 41 25.5	8.46	22 0 41.5	8 44 31.04	2.234	18 41 19.7	8.44
23	8 45 23.22	2.239	18 38 2.1	8.50	23 0 38.4	8 45 24.65	2.234	18 37 56.7	8.48
24	8 46 16.96	2.239	18 34 37.7	8.54	24 0 35.4	8 46 18.28	2.235	18 34 32.7	8.52
25	8 47 10.71	2.240	18 31 12.3	8.58	25 0 32.4	8 47 11.92	2.235	18 31 7.7	8.56
26	8 48 4.46	2.240	18 27 45.8	8.62	26 0 29.3	8 48 5.56	2.235	18 27 41.6	8.60
27	8 48 58.22	2.240	18 24 18.3	8.66	27 0 26.3	8 48 59.20	2.235	18 24 14.5	8.64
28	8 49 51.97	2.239	18 20 49.9	8.70	28 0 23.3	8 49 52.84	2.235	18 20 46.5	8.68
29	8 50 45.71	2.239	18 17 20.5	8.74	29 0 20.2	8 50 46.47	2.234	18 17 17.5	8.72
30	8 51 39.43	2.238	18 13 50.1	8.78	30 0 17.2	8 51 40.08	2.234	18 13 47.5	8.76
31	8 52 33.14	2.237	18 10 18.9	8.82	31 0 14.1	8 52 33.67	2.233	18 10 16.7	8.79
Aug. 1	8 53 26.82	2.236	18 6 46.8	8.86	1 0 11.1	8 53 27.24	2.232	18 6 45.1	8.83
2	8 54 20.47	2.235	18 3 13.8	8.89	2 0 8.0	8 54 20.78	2.231	18 3 12.6	8.87
3	8 55 14.09	2.234	17 59 40.0	8.93	3 0 5.0	8 55 14.29	2.229	17 59 39.2	8.90
4	8 56 7.68	2.232	17 56 5.4	8.96	4 0 1.9	8 56 7.76	2.227	17 56 5.1	8.93
5	8 57 1.22	2.230	17 52 30.0	8.99	4 23 58.9	8 57 1.18	2.225	17 52 30.2	8.96
6	8 57 54.71	2.228	17 48 53.8	9.02	5 23 55.8	8 57 54.55	2.223	17 48 54.5	8.99
7	8 58 48.14	2.226	17 45 16.9	9.05	6 23 52.8	8 58 47.87	2.221	17 45 18.1	9.02
8	8 59 41.52	2.223	17 41 39.3	9.08	7 23 49.7	8 59 41.14	2.218	17 41 40.9	9.05
9	9 0 34.83	2.220	17 38 1.0	9.11	8 23 46.7	9 0 34.34	2.215	17 38 3.1	9.08
10	9 1 28.06	2.217	17 34 22.1	9.14	9 23 43.6	9 1 27.47	2.212	17 34 24.6	9.11
11	9 2 21.25	2.214	17 30 42.5	9.17	10 23 40.6	9 2 20.53	2.209	17 30 45.5	9.14
12	9 3 14.34	2.211	17 27 2.3	9.20	11 23 37.5	9 3 13.51	2.206	17 27 5.7	9.17
13	9 4 7.34	2.207	17 23 21.6	9.22	12 23 34.4	9 4 6.40	2.202	17 23 25.5	9.19
14	9 5 0.25	2.203	17 19 40.3	9.24	13 23 31.4	9 4 59.20	2.198	17 19 44.7	9.21
15	9 5 53.07	2.199	17 15 58.5	9.26	14 23 28.3	9 5 51.91	2.194	17 16 3.4	9.23
16	9 6 45.79	2.195	17 12 16.2	9.28	15 23 25.3	9 6 44.52	2.190	17 12 21.6	9.25
17	9 7 38.41	2.191	17 8 33.4	9.30	16 23 22.2	9 7 37.03	2.186	17 8 39.3	9.27
18	9 8 30.92	2.187	17 4 50.2	9.32	17 23 19.1	9 8 29.43	2.182	17 4 56.6	9.29
19	9 9 23.33	2.182	17 1 6.6	9.34	18 23 16.1	9 9 21.73	2.177	17 1 13.5	9.31
20	9 10 15.63	2.177	16 57 22.7	9.36	19 23 13.0	9 10 13.92	2.172	16 57 30.0	9.32
21	9 11 7.81	2.172	16 53 38.4	9.37	20 23 9.9	9 11 6.00	2.167	16 53 46.2	9.34
22	9 11 59.87	2.167	16 49 53.7	9.38	21 23 6.8	9 11 57.95	2.162	16 50 2.0	9.35
23	9 12 51.81	2.162	16 46 8.7	9.39	22 23 3.8	9 12 49.78	2.157	16 46 17.5	9.36
24	9 13 43.62	2.157	16 42 23.5	9.40	23 23 0.7	9 13 41.49	2.152	16 42 32.8	9.37
25	9 14 35.30	2.151	16 38 38.0	9.41	24 22 57.6	9 14 33.07	2.146	16 38 47.8	9.38
26	9 15 26.84	2.145	16 34 52.3	9.41	25 22 54.5	9 15 24.51	2.140	16 35 2.6	9.39
27	9 16 18.24	2.139	16 31 6.4	9.42	26 22 51.5	9 16 15.80	2.134	16 31 17.2	9.40
28	9 17 9.50	2.133	16 27 20.3	9.42	27 22 48.4	9 17 6.95	2.128	16 27 31.5	9.40
29	9 18 0.60	2.129	16 23 34.1	9.43	28 22 45.3	9 17 57.95	2.122	16 23 45.8	9.41
30	9 18 51.55	2.120	16 19 47.8	9.43	29 22 42.2	9 18 48.80	2.116	16 20 0.0	9.41
31	9 19 42.34	+2.113	+16 16 1.4	- 9.43	30 22 39.1	9 19 39.49	+2.109	+16 16 14.1	- 9.41

Date. 1872.	FOR WASHINGTON MEAN NOON.				FOR MERIDIAN TRANSIT.				
	Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Mean Time of Transit.	Apparent Right Ascension.	Diff. for 1 h. of Long.	Apparent Declination.	Diff. for 1 hour of Long.
Sept. 1	<sup>h</sup> <sup>m</sup> <sup>s</sup> 9 20 32.96	<sup>s</sup> +2.105	<sup>°</sup> <sup>'</sup> <sup>"</sup> +16 12 15.0	<sup>"</sup> - 9.43	<sup>d</sup> <sup>h</sup> <sup>m</sup> 0 22 36.0	<sup>h</sup> <sup>m</sup> <sup>s</sup> 9 20 30.01	<sup>s</sup> +2.101	<sup>°</sup> <sup>'</sup> <sup>"</sup> +16 12 28.2	<sup>"</sup> - 9.41
2	9 21 23.40	2.098	16 8 28.6	9.43	1 22 32.9	9 21 20.35	2.094	16 8 42.3	9.41
3	9 22 13.67	2.091	16 4 42.3	9.43	2 22 29.8	9 22 10.52	2.086	16 4 56.5	9.41
4	9 23 3.75	2.083	16 0 56.0	9.42	3 22 26.7	9 23 0.51	2.078	16 1 10.7	9.40
5	9 23 53.64	2.075	15 57 9.9	9.42	4 22 23.6	9 23 50.30	2.070	15 57 25.0	9.40
6	9 24 43.33	2.067	15 53 24.0	9.41	5 22 20.5	9 24 39.90	2.062	15 53 39.6	9.39
7	9 25 32.82	2.058	15 49 38.3	9.40	6 22 17.4	9 25 29.30	2.054	15 49 54.4	9.38
8	9 26 22.11	2.049	15 45 52.9	9.39	7 22 14.3	9 26 18.50	2.045	15 46 9.5	9.37
9	9 27 11.19	2.040	15 42 7.7	9.38	8 22 11.2	9 27 7.49	2.036	15 42 24.8	9.36
10	9 28 0.05	2.031	15 38 22.9	9.37	9 22 8.1	9 27 56.26	2.027	15 38 40.4	9.35
11	9 28 48.69	2.022	15 34 38.4	9.35	10 22 5.0	9 28 44.81	2.018	15 34 56.3	9.33
12	9 29 37.11	2.013	15 30 54.3	9.33	11 22 1.9	9 29 33.14	2.009	15 31 12.7	9.31
13	9 30 25.30	2.003	15 27 10.6	9.31	12 21 58.8	9 30 21.25	2.000	15 27 29.4	9.29
14	9 31 13.26	1.993	15 23 27.4	9.29	13 21 55.6	9 31 9.13	1.990	15 23 46.7	9.27
15	9 32 0.99	1.983	15 19 44.6	9.27	14 21 52.5	9 31 56.77	1.980	15 20 4.3	9.25
16	9 32 48.47	1.973	15 16 2.4	9.25	15 21 49.4	9 32 44.17	1.970	15 16 22.5	9.23
17	9 33 35.70	1.963	15 12 20.8	9.23	16 21 46.2	9 33 31.32	1.960	15 12 41.3	9.21
18	9 34 22.68	1.952	15 8 39.8	9.20	17 21 43.0	9 34 18.22	1.950	15 9 0.8	9.18
19	9 35 9.40	1.941	15 4 59.4	9.17	18 21 39.9	9 35 4.86	1.939	15 5 20.8	9.15
20	9 35 55.87	1.930	15 1 19.7	9.14	19 21 36.7	9 35 51.25	1.928	15 1 41.5	9.12
21	9 36 42.07	1.919	14 57 40.7	9.11	20 21 33.5	9 36 37.38	1.917	14 58 2.9	9.09
22	9 37 28.00	1.908	14 54 2.5	9.08	21 21 30.3	9 37 23.24	1.906	14 54 25.1	9.06
23	9 38 13.66	1.896	14 50 25.0	9.05	22 21 27.2	9 38 8.83	1.894	14 50 48.0	9.03
24	9 38 59.04	1.884	14 46 48.3	9.01	23 21 24.0	9 38 54.14	1.882	14 47 11.7	8.99
25	9 39 44.13	1.872	14 43 12.6	8.97	24 21 20.8	9 39 39.16	1.870	14 43 36.4	8.96
26	9 40 28.93	1.860	14 39 37.8	8.93	25 21 17.6	9 40 23.89	1.858	14 40 2.0	8.91
27	9 41 13.43	1.848	14 36 3.9	8.89	26 21 14.4	9 41 8.33	1.845	14 36 28.4	8.89
28	9 41 57.63	1.835	14 32 31.1	8.85	27 21 11.2	9 41 52.47	1.832	14 32 56.0	8.83
29	9 42 41.52	1.822	14 28 59.3	8.80	28 21 8.0	9 42 36.30	1.819	14 29 24.5	8.79
30	9 43 25.09	1.809	14 25 28.6	8.75	29 21 4.8	9 43 19.81	1.806	14 25 54.2	8.74
Oct. 1	9 44 8.33	1.795	14 21 59.1	8.70	0 21 1.6	9 44 3.00	1.793	14 22 25.0	8.69
2	9 44 51.24	1.781	14 18 30.8	8.65	1 20 58.4	9 44 45.85	1.779	14 18 57.0	8.64
3	9 45 33.82	1.767	14 15 3.7	8.60	2 20 55.2	9 45 28.38	1.765	14 15 30.2	8.59
4	9 46 16.06	1.753	14 11 37.9	8.55	3 20 51.9	9 46 10.57	1.751	14 12 4.7	8.54
5	9 46 57.95	1.738	14 8 13.5	8.49	4 20 48.7	9 46 52.41	1.736	14 8 40.6	8.48
6	9 47 39.49	1.723	14 4 50.4	8.43	5 20 45.5	9 47 33.90	1.721	14 5 17.8	8.42
7	9 48 20.67	1.708	14 1 28.8	8.37	6 20 42.3	9 48 15.04	1.706	14 1 56.4	8.36
8	9 49 1.48	1.693	13 58 8.7	8.31	7 20 39.0	9 48 55.81	1.691	13 58 36.6	8.30
9	9 49 41.91	1.677	13 54 50.1	8.25	8 20 35.8	9 49 36.20	1.676	13 55 18.2	8.24
10	9 50 21.96	1.661	13 51 33.0	8.18	9 20 32.5	9 50 16.21	1.660	13 52 1.3	8.17
11	9 51 1.64	1.645	13 48 17.5	8.11	10 20 29.2	9 50 55.86	1.644	13 48 46.0	8.10
12	9 51 40.93	1.629	13 45 3.7	8.04	11 20 25.9	9 51 35.12	1.628	13 45 32.4	8.03
13	9 52 19.83	1.613	13 41 51.7	7.97	12 20 22.6	9 52 13.99	1.612	13 42 20.6	7.96
14	9 52 58.34	1.596	13 38 41.5	7.90	13 20 19.3	9 52 52.47	1.595	13 39 10.6	7.89
15	9 53 36.44	1.579	13 35 33.0	7.82	14 20 16.0	9 53 30.54	1.578	13 36 2.2	7.81
16	9 54 14.13	1.562	13 32 26.3	7.74	15 20 12.7	9 54 8.21	1.561	13 32 55.7	7.73
17	9 54 51.41	1.545	13 29 21.5	7.66	16 20 9.4	9 54 45.47	1.544	13 29 51.0	7.65
18	9 55 28.27	1.527	13 26 18.7	7.58	17 20 6.1	9 55 22.31	1.526	13 26 48.3	7.57
19	9 56 4.71	1.509	13 23 17.8	7.50	18 20 2.8	9 55 58.74	1.508	13 23 47.5	7.49
20	9 56 40.71	1.491	13 20 18.9	7.41	19 19 59.4	9 56 34.74	1.490	13 20 48.7	7.41
21	9 57 16.27	1.473	13 17 22.1	7.32	20 19 56.1	9 57 10.30	1.472	13 17 51.9	7.32
22	9 57 51.39	1.454	13 14 27.4	7.23	21 19 52.8	9 57 45.39	1.453	13 14 57.3	7.23
23	9 58 26.05	1.435	13 11 34.9	7.14	22 19 49.4	9 58 20.05	1.434	13 12 4.8	7.14
24	9 59 0.25	1.416	13 8 44.6	7.05	23 19 46.0	9 58 54.25	1.415	13 9 14.5	7.05
25	9 59 33.99	1.396	13 5 56.6	6.95	24 19 42.7	9 59 28.00	1.396	13 6 26.5	6.96
26	10 0 7.25	1.376	13 3 10.9	6.85	25 19 39.3	10 0 1.27	1.376	13 3 40.7	6.86
27	10 0 40.03	1.356	13 0 27.6	6.75	26 19 35.9	10 0 34.06	1.356	13 0 57.4	6.76
28	10 1 12.33	1.335	12 57 46.7	6.65	27 19 32.5	10 1 6.38	1.336	12 58 16.4	6.66
29	10 1 44.13	1.314	12 55 8.3	6.55	28 19 29.1	10 1 38.20	1.315	12 55 37.9	6.56
30	10 2 15.43	1.293	12 52 32.5	6.44	29 19 25.7	10 2 9.52	1.294	12 53 2.0	6.45
31	10 2 46.22	1.272	12 49 59.1	6.33	30 19 22.3	10 2 40.33	1.273	12 50 25.5	6.34
32	10 3 16.50	+1.251	+12 47 28.4	- 6.22	31 19 18.9	10 3 10.64	+1.252	+12 47 57.6	- 6.23

Date. 1872.	FOR WASHINGTON MEAN NOON.				FOR MERIDIAN TRANSIT.				
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Nov. 1	10 3 16.50	+1.251	+12 47 28.4	- 6.22	1 19 15.5	10 3 40.43	+1.230	+12 45 29.4	- 6.12
2	10 3 46.26	1.220	12 45 0.4	6.11	2 19 12.1	10 4 9.68	1.208	12 43 4.0	6.00
3	10 4 15.48	1.207	12 42 35.2	6.00	3 19 8.6	10 4 38.41	1.186	12 40 41.4	5.88
4	10 4 44.17	1.184	12 40 12.8	5.88	4 19 5.1	10 5 6.60	1.163	12 38 21.6	5.76
5	10 5 12.32	1.161	12 37 53.2	5.76	5 19 1.6	10 5 34.25	1.140	12 36 4.6	5.64
6	10 5 39.92	1.138	12 35 36.5	5.64	6 18 58.1	10 6 1.33	1.117	12 33 50.5	5.52
7	10 6 6.96	1.115	12 33 22.7	5.52	7 18 54.6	10 6 27.86	1.094	12 31 39.4	5.40
8	10 6 33.44	1.092	12 31 11.9	5.39	8 18 51.0	10 6 53.84	1.070	12 29 31.3	5.27
9	10 6 59.36	1.068	12 29 4.1	5.26	9 18 47.5	10 7 19.25	1.046	12 27 26.2	5.14
10	10 7 24.71	1.044	12 26 59.4	5.13	10 18 44.0	10 7 44.08	1.022	12 25 24.3	5.01
11	10 7 49.47	1.020	12 24 57.9	5.00	11 18 40.5	10 8 8.33	0.998	12 23 25.5	4.88
12	10 8 13.65	0.995	12 22 59.5	4.87	12 18 36.9	10 8 32.00	0.974	12 21 29.9	4.75
13	10 8 37.24	0.970	12 21 4.3	4.74	13 18 33.4	10 8 55.08	0.949	12 19 37.4	4.62
14	10 9 0.24	0.945	12 19 12.3	4.60	14 18 29.9	10 9 17.56	0.924	12 17 48.1	4.48
15	10 9 22.64	0.920	12 17 23.5	4.46	15 18 26.3	10 9 39.43	0.899	12 16 2.2	4.34
16	10 9 44.43	0.895	12 15 38.1	4.32	16 18 22.7	10 10 0.70	0.873	12 14 19.7	4.20
17	10 10 5.61	0.869	12 13 56.1	4.18	17 18 19.1	10 10 21.37	0.847	12 12 40.5	4.06
18	10 10 26.18	0.843	12 12 17.5	4.04	18 18 15.5	10 10 41.41	0.821	12 11 4.7	3.92
19	10 10 46.12	0.817	12 10 42.3	3.90	19 18 11.9	10 11 0.81	0.795	12 9 32.4	3.78
20	10 11 5.42	0.791	12 9 10.6	3.75	20 18 8.3	10 11 19.58	0.769	12 8 3.6	3.63
21	10 11 24.08	0.764	12 7 42.4	3.60	21 18 4.7	10 11 37.72	0.742	12 6 38.3	3.48
22	10 11 42.10	0.737	12 6 17.8	3.45	22 18 1.1	10 11 55.20	0.715	12 5 16.7	3.33
23	10 11 59.46	0.710	12 4 56.9	3.30	23 17 57.4	10 12 12.02	0.688	12 3 58.8	3.18
24	10 12 16.16	0.682	12 3 39.7	3.15	24 17 53.7	10 12 28.19	0.660	12 2 44.5	3.03
25	10 12 32.20	0.654	12 2 26.2	2.99	25 17 50.0	10 12 43.69	0.632	12 1 33.9	2.87
26	10 12 47.57	0.626	12 1 16.4	2.83	26 17 46.3	10 12 58.50	0.604	12 0 27.1	2.71
27	10 13 2.25	0.598	12 0 10.4	2.67	27 17 42.6	10 13 12.64	0.576	11 59 24.2	2.55
28	10 13 16.25	0.569	11 59 8.3	2.51	28 17 38.9	10 13 26.10	0.547	11 58 25.1	2.39
29	10 13 29.56	0.540	11 56 10.1	2.35	29 17 35.2	10 13 38.88	0.518	11 57 29.8	2.23
30	10 13 42.18	0.511	11 57 15.7	2.19	30 17 31.5	10 13 50.96	0.489	11 56 38.5	2.06
Dec. 1	10 13 54.10	0.482	11 56 25.3	2.03	1 17 27.8	10 14 2.34	0.460	11 55 51.1	1.90
2	10 14 5.32	0.453	11 55 38.9	1.86	2 17 24.0	10 14 13.02	0.431	11 55 7.7	1.73
3	10 14 15.83	0.423	11 54 56.5	1.69	3 17 20.2	10 14 22.98	0.401	11 54 28.3	1.56
4	10 14 25.62	0.393	11 54 18.1	1.52	4 17 16.4	10 14 32.22	0.371	11 53 52.9	1.39
5	10 14 34.69	0.363	11 53 43.7	1.35	5 17 12.6	10 14 40.76	0.341	11 53 21.6	1.22
6	10 14 43.05	0.333	11 53 13.4	1.18	6 17 8.8	10 14 48.58	0.311	11 52 54.3	1.05
7	10 14 50.68	0.303	11 52 47.2	1.01	7 17 5.0	10 14 55.68	0.281	11 52 31.1	0.88
8	10 14 57.59	0.273	11 52 25.1	0.84	8 17 1.2	10 15 2.05	0.251	11 52 12.0	0.71
9	10 15 3.77	0.243	11 52 7.1	0.67	9 16 57.4	10 15 7.71	0.221	11 51 57.0	0.54
10	10 15 9.23	0.212	11 51 53.3	0.50	10 16 53.5	10 15 12.65	0.190	11 51 46.1	0.37
11	10 15 13.96	0.181	11 51 43.6	0.32	11 16 49.7	10 15 16.85	0.160	11 51 39.3	0.20
12	10 15 17.95	0.151	11 51 38.1	- 0.15	12 16 45.8	10 15 20.32	0.130	11 51 36.7	- 0.03
13	10 15 21.21	0.120	11 51 36.7	+ 0.02	13 16 41.9	10 15 23.05	0.099	11 51 38.2	+ 0.14
14	10 15 23.73	0.089	11 51 39.5	0.20	14 16 38.0	10 15 25.05	0.068	11 51 43.9	0.31
15	10 15 25.51	0.058	11 51 46.5	0.37	15 16 34.1	10 15 26.31	0.037	11 51 53.6	0.49
16	10 15 26.55	+0.027	11 51 57.6	0.55	16 16 30.2	10 15 26.83	+0.006	11 52 7.6	0.66
17	10 15 26.84	-0.004	11 52 12.9	0.72	17 16 26.3	10 15 26.61	-0.025	11 52 25.8	0.84
18	10 15 26.39	0.035	11 52 32.4	0.90	18 16 22.3	10 15 25.65	0.056	11 52 48.1	1.01
19	10 15 25.19	0.066	11 52 56.1	1.07	19 16 18.3	10 15 23.96	0.087	11 53 14.5	1.18
20	10 15 23.25	0.097	11 53 23.9	1.25	20 16 14.3	10 15 21.52	0.118	11 53 45.1	1.36
21	10 15 20.56	0.128	11 53 55.9	1.42	21 16 10.3	10 15 18.32	0.149	11 54 19.8	1.54
22	10 15 17.11	0.159	11 54 32.1	1.60	22 16 6.3	10 15 14.38	0.180	11 54 58.7	1.72
23	10 15 12.91	0.190	11 55 12.5	1.77	23 16 2.3	10 15 9.69	0.211	11 55 41.8	1.89
24	10 15 7.96	0.221	11 55 57.1	1.95	24 15 58.3	10 15 4.25	0.242	11 56 29.0	2.06
25	10 15 2.26	0.252	11 56 45.8	2.12	25 15 54.3	10 14 58.08	0.273	11 57 20.4	2.23
26	10 14 55.82	0.283	11 57 38.7	2.29	26 15 50.2	10 14 51.17	0.304	11 58 15.9	2.40
27	10 14 48.64	0.314	11 58 35.7	2.46	27 15 46.2	10 14 43.52	0.335	11 59 15.3	2.57
28	10 14 40.72	0.345	11 59 36.7	2.63	28 15 42.1	10 14 35.13	0.365	12 0 18.8	2.74
29	10 14 32.05	0.376	12 0 41.8	2.80	29 15 38.0	10 14 26.01	0.395	12 1 26.3	2.90
30	10 14 22.65	0.407	12 1 50.9	2.97	30 15 33.9	10 14 16.16	0.425	12 2 37.8	3.06
31	10 14 12.52	0.437	12 3 4.0	3.13	31 15 29.8	10 14 5.59	0.455	12 3 53.2	3.22
32	10 14 1.67	-0.467	+12 4 21.0	- 3.29	32 15 25.7	10 13 54.29	-0.485	+12 5 12.6	+ 3.38



Date. 1872.	FOR WASHINGTON MEAN NOON.				FOR MERIDIAN TRANSIT.					
	Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Mean Time of Transit.	Apparent Right Ascension.	Diff. for 1 h. of Long.	Apparent Declination.	Diff. for 1 hour of Long.	
	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>"</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>	<sup>d</sup> <sup>h</sup> <sup>m</sup>	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>"</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>	
Jan. 1	18 52 20.14	+1.277	22 30 6.8	+ 1.42	1 0 9.6	18 52 20.34	+1.274	22 30 6.6	+ 1.42	
2	18 52 50.79	1.277	22 29 32.5	1.44	2 0 6.2	18 52 50.92	1.274	22 29 32.4	1.43	
3	18 53 21.44	1.277	22 28 57.8	1.45	3 0 2.8	18 53 21.50	1.274	22 28 57.8	1.45	
					3 23 59.4	18 53 52.07	1.274	22 28 22.8	1.47	
4	18 53 52.08	1.276	22 28 22.7	1.47	4 23 55.9	18 54 22.63	1.273	22 27 47.4	1.48	
5	18 54 22.71	1.276	22 27 47.2	1.49	5 23 52.5	18 54 53.17	1.272	22 27 11.6	1.50	
6	18 54 53.32	1.275	22 27 11.3	1.50	6 23 49.1	18 55 23.69	1.271	22 26 35.4	1.52	
7	18 55 23.91	1.274	22 26 35.0	1.52	7 23 45.7	18 55 51.18	1.270	22 25 58.8	1.53	
8	18 55 54.48	1.273	22 25 58.3	1.54	8 23 42.2	18 56 24.65	1.269	22 25 21.8	1.55	
9	18 56 25.02	1.272	22 25 21.3	1.55	9 23 38.8	18 56 55.09	1.268	22 24 44.5	1.56	
10	18 56 55.53	1.270	22 24 43.9	1.56	10 23 35.4	18 57 25.49	1.266	22 24 6.9	1.57	
11	18 57 26.00	1.269	22 24 6.2	1.58	11 23 32.0	18 57 55.84	1.263	22 23 28.9	1.59	
12	18 57 56.43	1.267	22 23 28.1	1.59	12 23 28.5	18 58 26.13	1.261	22 22 50.6	1.60	
13	18 58 26.80	1.264	22 22 49.7	1.61	13 23 25.1	18 58 56.36	1.258	22 22 12.0	1.61	
14	18 58 57.11	1.261	22 22 11.0	1.62	14 23 21.7	18 59 26.53	1.256	22 21 33.1	1.63	
15	18 59 27.35	1.259	22 21 32.0	1.63	15 23 18.3	18 59 56.63	1.253	22 20 53.9	1.64	
16	18 59 57.52	1.255	22 20 52.7	1.64	16 23 14.8	19 0 26.65	1.249	22 20 14.4	1.65	
17	19 0 27.61	1.252	22 20 13.1	1.66	17 23 11.4	19 0 56.60	1.246	22 19 34.6	1.66	
18	19 0 57.62	1.249	22 19 33.2	1.67	18 23 8.0	19 1 26.47	1.243	22 18 54.6	1.67	
19	19 1 27.55	1.245	22 18 53.1	1.68	19 23 4.5	19 1 56.26	1.239	22 18 14.3	1.68	
20	19 1 57.40	1.242	22 18 12.7	1.69	20 23 1.1	19 2 25.95	1.235	22 17 33.8	1.69	
21	19 2 27.16	1.238	22 17 32.1	1.70	21 22 57.6	19 2 55.54	1.231	22 16 53.0	1.70	
22	19 2 56.82	1.234	22 16 51.2	1.71	22 22 54.2	19 3 25.03	1.227	22 16 12.0	1.71	
23	19 3 26.38	1.229	22 16 10.1	1.72	23 22 50.7	19 3 54.42	1.222	22 15 30.8	1.72	
24	19 3 55.83	1.225	22 15 28.8	1.73	24 22 47.3	19 4 23.70	1.218	22 14 49.4	1.73	
25	19 4 25.17	1.220	22 14 47.3	1.73	25 22 43.9	19 4 52.86	1.213	22 14 7.8	1.74	
26	19 4 54.40	1.215	22 14 5.6	1.74	26 22 40.4	19 5 21.90	1.207	22 13 26.0	1.75	
27	19 5 23.51	1.210	22 13 23.7	1.75	27 22 37.0	19 5 50.82	1.202	22 12 44.0	1.75	
28	19 5 52.49	1.205	22 12 41.6	1.76	28 22 33.5	19 6 19.61	1.197	22 12 1.9	1.76	
29	19 6 21.34	1.199	22 11 59.4	1.76	29 22 30.0	19 6 48.27	1.191	22 11 19.7	1.76	
30	19 6 50.06	1.194	22 11 17.1	1.76	30 22 26.6	19 7 16.80	1.186	22 10 37.4	1.76	
31	19 7 18.65	1.188	22 10 34.7	1.77	31 22 23.1	19 7 45.18	1.179	22 9 55.0	1.77	
Feb. 1	19 7 47.09	1.182	22 9 52.2	1.77	1 22 19.7	19 8 13.41	1.173	22 9 12.6	1.77	
2	19 8 15.38	1.176	22 9 9.6	1.78	2 22 16.2	19 8 41.49	1.167	22 8 30.0	1.78	
3	19 8 43.52	1.169	22 8 26.9	1.78	3 22 12.7	19 9 9.41	1.160	22 7 47.3	1.78	
4	19 9 11.50	1.162	22 7 44.1	1.79	4 22 9.3	19 9 37.17	1.153	22 7 4.5	1.78	
5	19 9 39.32	1.156	22 7 1.2	1.79	5 22 5.8	19 10 4.77	1.146	22 6 21.7	1.79	
6	19 10 6.97	1.148	22 6 18.3	1.79	6 22 2.3	19 10 32.20	1.139	22 5 38.8	1.79	
7	19 10 34.44	1.141	22 5 35.3	1.79	7 21 58.8	19 10 59.45	1.131	22 4 55.9	1.79	
8	19 11 1.73	1.133	22 4 52.3	1.79	8 21 55.4	19 11 26.51	1.124	22 4 13.0	1.79	
9	19 11 28.84	1.126	22 4 9.3	1.79	9 21 51.9	19 11 53.39	1.116	22 3 30.1	1.79	
10	19 11 55.77	1.118	22 3 26.3	1.79	10 21 48.4	19 12 20.08	1.108	22 2 47.3	1.78	
11	19 12 22.51	1.110	22 2 43.4	1.79	11 21 44.9	19 12 46.57	1.099	22 2 4.5	1.78	
12	19 12 49.05	1.101	22 2 0.5	1.79	12 21 41.4	19 13 12.85	1.091	22 1 21.7	1.78	
13	19 13 15.38	1.093	22 1 17.6	1.79	13 21 37.9	19 13 38.93	1.082	22 0 39.0	1.78	
14	19 13 41.50	1.084	22 0 34.8	1.78	14 21 34.4	19 14 4.79	1.073	21 59 56.4	1.77	
15	19 14 7.40	1.075	21 59 52.1	1.78	15 21 30.9	19 14 30.43	1.064	21 59 13.9	1.77	
16	19 14 33.08	1.065	21 59 9.5	1.77	16 21 27.4	19 14 55.85	1.055	21 58 31.5	1.76	
17	19 14 58.54	1.056	21 58 27.0	1.77	17 21 23.9	19 15 21.05	1.045	21 57 49.2	1.76	
18	19 15 23.78	1.047	21 57 44.7	1.76	18 21 20.3	19 15 46.03	1.036	21 57 7.1	1.75	
19	19 15 48.80	1.038	21 57 2.5	1.76	19 21 16.8	19 16 10.79	1.027	21 56 25.1	1.75	
20	19 16 13.59	1.028	21 56 20.4	1.75	20 21 13.3	19 16 35.31	1.017	21 55 43.3	1.74	
21	19 16 38.14	1.018	21 55 38.5	1.74	21 21 9.8	19 16 59.59	1.006	21 55 1.7	1.73	
22	19 17 2.45	1.008	21 54 56.8	1.73	22 21 6.2	19 17 23.62	0.996	21 54 20.3	1.72	
23	19 17 26.51	0.997	21 54 15.3	1.72	23 21 2.7	19 17 47.40	0.985	21 53 39.1	1.71	
24	19 17 50.32	0.987	21 53 34.1	1.71	24 20 59.2	19 18 10.92	0.975	21 52 58.2	1.70	
25	19 18 13.87	0.976	21 52 53.1	1.70	25 20 55.6	19 18 34.19	0.964	21 52 17.5	1.69	
26	19 18 37.16	0.965	21 52 12.3	1.69	26 20 52.1	19 18 57.20	0.953	21 51 37.1	1.68	
27	19 19 0.19	0.954	21 51 31.8	1.68	27 20 48.5	19 19 19.95	0.942	21 50 57.0	1.66	
28	19 19 22.96	0.943	21 50 51.6	1.67	28 20 44.9	19 19 42.43	0.931	21 50 17.2	1.65	
29	19 19 45.46	0.932	21 50 11.7	1.66	29 20 41.4	19 20 4.64	0.920	21 49 37.6	1.64	
30	19 20 7.69	+0.921	21 49 32.1	+ 1.65	30 20 37.8	19 20 26.58	+0.909	21 48 58.3	+ 1.63	

Date. 1872.	FOR WASHINGTON MEAN NOON.				FOR MERIDIAN TRANSIT.				
	Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Mean Time of Transit.	Apparent Right Ascension.	Diff. for 1 h. of Long.	Apparent Declination.	Diff. for 1 hour of Long.
Mar. 1	<sup>h</sup> 19 <sup>m</sup> 20 <sup>s</sup> 7.69	+0.921	<sup>°</sup> 21 <sup>'</sup> 49 <sup>"</sup> 32.1	+ 1.65	<sup>d</sup> 1 <sup>h</sup> 20 <sup>m</sup> 37.8	<sup>h</sup> 19 <sup>m</sup> 20 <sup>s</sup> 26.58	+0.909	<sup>°</sup> 21 <sup>'</sup> 48 <sup>"</sup> 58.3	+ 1.63
2	19 20 29.65	0.909	21 48 52.7	1.63	2 20 34.2	19 20 48.25	0.897	21 48 19.3	1.62
3	19 20 51.33	0.897	21 48 13.7	1.62	3 20 30.7	19 21 9.63	0.885	21 47 40.7	1.60
4	19 21 12.72	0.885	21 47 35.1	1.60	4 20 27.1	19 21 30.71	0.872	21 47 2.5	1.58
5	19 21 33.81	0.873	21 46 56.9	1.58	5 20 23.5	19 21 51.49	0.860	21 46 24.8	1.56
6	19 21 54.60	0.860	21 46 19.1	1.56	6 20 19.9	19 22 11.97	0.847	21 45 47.5	1.55
7	19 22 15.08	0.847	21 45 41.8	1.55	7 20 16.3	19 22 32.14	0.834	21 45 10.6	1.53
8	19 22 35.26	0.835	21 45 4.9	1.53	8 20 12.7	19 22 52.01	0.822	21 44 34.1	1.51
9	19 22 55.14	0.822	21 44 28.4	1.51	9 20 9.1	19 23 11.58	0.809	21 43 58.1	1.49
10	19 23 14.71	0.809	21 43 52.3	1.49	10 20 5.5	19 23 30.84	0.796	21 43 22.5	1.48
11	19 23 33.96	0.795	21 43 16.7	1.48	11 20 1.9	19 23 49.78	0.782	21 42 47.3	1.46
12	19 23 52.89	0.782	21 42 41.5	1.46	12 19 58.2	19 24 8.39	0.769	21 42 12.6	1.43
13	19 24 11.49	0.768	21 42 6.8	1.43	13 19 54.6	19 24 26.67	0.755	21 41 38.5	1.41
14	19 24 29.76	0.754	21 41 32.7	1.41	14 19 51.0	19 24 44.62	0.741	21 41 5.0	1.39
15	19 24 47.70	0.741	21 40 59.2	1.39	15 19 47.3	19 25 2.24	0.727	21 40 32.0	1.36
16	19 25 5.31	0.727	21 40 26.2	1.36	16 19 43.7	19 25 19.53	0.713	21 39 59.5	1.34
17	19 25 22.58	0.713	21 39 53.8	1.34	17 19 40.1	19 25 36.48	0.699	21 39 27.6	1.32
18	19 25 39.51	0.698	21 39 21.9	1.32	18 19 36.4	19 25 53.08	0.685	21 38 56.3	1.29
19	19 25 56.09	0.684	21 38 50.6	1.29	19 19 32.7	19 26 9.34	0.670	21 38 25.6	1.27
20	19 26 12.32	0.669	21 38 19.9	1.26	20 19 29.1	19 26 25.25	0.656	21 37 55.5	1.24
21	19 26 28.20	0.655	21 37 49.9	1.24	21 19 25.4	19 26 40.81	0.641	21 37 26.0	1.21
22	19 26 43.74	0.640	21 37 20.5	1.21	22 19 21.7	19 26 56.02	0.626	21 36 57.2	1.19
23	19 26 58.93	0.625	21 36 51.7	1.19	23 19 18.0	19 27 10.88	0.611	21 36 29.1	1.16
24	19 27 13.76	0.610	21 36 23.6	1.16	24 19 14.3	19 27 25.37	0.596	21 36 1.6	1.13
25	19 27 28.22	0.595	21 35 56.2	1.13	25 19 10.6	19 27 39.50	0.581	21 35 34.8	1.10
26	19 27 42.31	0.579	21 35 29.4	1.10	26 19 6.9	19 27 53.26	0.566	21 35 8.6	1.08
27	19 27 56.03	0.564	21 35 3.3	1.07	27 19 3.2	19 28 6.65	0.550	21 34 43.1	1.05
28	19 28 9.38	0.549	21 34 37.9	1.04	28 18 59.5	19 28 19.67	0.535	21 34 18.4	1.02
29	19 28 22.36	0.533	21 34 13.3	1.01	29 18 55.8	19 28 32.33	0.520	21 33 54.4	0.99
30	19 28 34.97	0.518	21 33 49.4	0.98	30 18 52.1	19 28 44.62	0.504	21 33 31.1	0.95
31	19 28 47.21	0.502	21 33 26.2	0.95	31 18 48.3	19 28 5.54	0.489	21 33 8.6	0.92
Apr. 1	19 28 59.08	0.486	21 33 3.8	0.92	1 18 44.6	19 29 8.08	0.473	21 32 46.9	0.89
2	19 29 10.56	0.470	21 32 42.2	0.89	2 18 40.8	19 29 19.23	0.456	21 32 25.9	0.86
3	19 29 21.65	0.454	21 32 21.3	0.85	3 18 37.1	19 29 29.98	0.440	21 32 5.7	0.82
4	19 29 32.34	0.437	21 32 1.2	0.82	4 18 33.3	19 29 40.33	0.423	21 31 46.3	0.79
5	19 29 42.63	0.421	21 31 41.9	0.79	5 18 29.6	19 29 50.29	0.407	21 31 27.6	0.76
6	19 29 52.53	0.404	21 31 23.4	0.75	6 18 25.8	19 29 59.86	0.390	21 31 9.7	0.73
7	19 30 2.03	0.388	21 31 5.7	0.72	7 18 22.0	19 30 9.03	0.374	21 30 52.7	0.69
8	19 30 11.13	0.371	21 30 48.9	0.68	8 18 18.2	19 30 17.80	0.357	21 30 36.6	0.65
9	19 30 19.83	0.354	21 30 32.9	0.65	9 18 14.4	19 30 26.17	0.340	21 30 21.4	0.62
10	19 30 28.12	0.337	21 30 17.8	0.61	10 18 10.6	19 30 34.13	0.323	21 30 7.0	0.58
11	19 30 36.01	0.320	21 30 3.6	0.58	11 18 6.8	19 30 41.69	0.306	21 29 53.4	0.55
12	19 30 43.49	0.303	21 29 50.2	0.54	12 18 3.0	19 30 48.84	0.290	21 29 40.7	0.51
13	19 30 50.56	0.286	21 29 37.7	0.50	13 17 59.2	19 30 55.59	0.273	21 29 28.9	0.47
14	19 30 57.23	0.269	21 29 26.1	0.47	14 17 55.4	19 31 1.94	0.256	21 29 17.9	0.44
15	19 31 3.49	0.252	21 29 15.3	0.43	15 17 51.5	19 31 7.88	0.239	21 29 7.8	0.40
16	19 31 9.34	0.235	21 29 5.4	0.39	16 17 47.6	19 31 13.41	0.222	21 28 58.6	0.36
17	19 31 14.78	0.218	21 28 56.4	0.36	17 17 43.9	19 31 18.53	0.205	21 28 50.3	0.33
18	19 31 19.81	0.201	21 28 48.3	0.32	18 17 40.0	19 31 23.24	0.188	21 28 42.9	0.29
19	19 31 24.42	0.183	21 28 41.2	0.28	19 17 36.1	19 31 27.53	0.170	21 28 36.5	0.25
20	19 31 28.61	0.166	21 28 35.0	0.24	20 17 32.3	19 31 31.41	0.153	21 28 31.0	0.21
21	19 31 32.39	0.149	21 28 29.7	0.20	21 17 28.4	19 31 34.88	0.136	21 28 26.4	0.17
22	19 31 35.76	0.132	21 28 25.3	0.16	22 17 24.5	19 31 37.94	0.119	21 28 22.7	0.14
23	19 31 38.72	0.115	21 28 21.8	0.13	23 17 20.6	19 31 40.59	0.102	21 28 19.9	0.10
24	19 31 41.26	0.097	21 28 19.2	0.09	24 17 16.7	19 31 42.83	0.085	21 28 17.9	0.06
25	19 31 43.39	0.080	21 28 17.5	0.05	25 17 12.8	19 31 44.66	0.068	21 28 16.9	+ 0.02
26	19 31 45.11	0.063	21 28 16.8	+ 0.01	26 17 8.9	19 31 46.08	0.051	21 28 16.8	- 0.02
27	19 31 46.41	0.046	21 28 17.0	- 0.03	27 17 5.0	19 31 47.09	0.033	21 28 17.7	0.06
28	19 31 47.30	0.028	21 28 18.2	0.07	28 17 1.1	19 31 47.68	+0.016	21 28 19.5	0.10
29	19 31 47.77	+0.011	21 28 20.3	0.11	29 16 57.2	19 31 47.85	-0.001	21 28 22.3	0.14
30	19 31 47.82	-0.007	21 28 23.3	0.15	30 16 53.2	19 31 47.61	0.019	21 28 26.0	0.17
31	19 31 47.45	-0.024	21 28 27.3	- 0.19	31 16 49.3	19 31 46.95	-0.036	21 28 30.6	- 0.21

Date. 1872.	FOR WASHINGTON MEAN NOON.					FOR MERIDIAN TRANSIT.				
	Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Mean Time of Transit.	Apparent Right Ascension.	Diff. for 1 h. of Long.	Apparent Declination.	Diff. for 1 hour of Long.	
	<sup>h</sup> <sup>m</sup> <sup>s</sup>	"	° ' "	"	<sup>d</sup> <sup>h</sup> <sup>m</sup>	<sup>h</sup> <sup>m</sup> <sup>s</sup>	"	° ' "	"	
May 1	19 31 47.45	-0.024	-21° 28' 27.3	- 0.19	1 16 49.3	19 31 46.95	-0.036	-21° 28' 30.6	- 0.21	
2	19 31 46.67	0.041	21 28 32.2	0.22	2 16 45.3	19 31 45.88	0.053	21 28 36.1	0.25	
3	19 31 45.48	0.058	21 28 38.0	0.26	3 16 41.4	19 31 44.40	0.070	21 28 42.5	0.29	
4	19 31 43.87	0.076	21 28 44.7	0.30	4 16 37.4	19 31 42.50	0.088	21 28 49.8	0.32	
5	19 31 41.84	0.093	21 28 52.3	0.34	5 16 33.4	19 31 40.19	0.105	21 28 58.1	0.36	
6	19 31 39.39	0.111	21 29 0.9	0.38	6 16 29.5	19 31 37.47	0.122	21 29 7.3	0.40	
7	19 31 36.53	0.128	21 29 10.4	0.41	7 16 25.5	19 31 34.34	0.139	21 29 17.4	0.44	
8	19 31 33.26	0.145	21 29 20.8	0.45	8 16 21.5	19 31 30.81	0.155	21 29 28.4	0.48	
9	19 31 29.59	0.161	21 29 32.1	0.49	9 16 17.5	19 31 26.88	0.172	21 29 40.3	0.51	
10	19 31 25.52	0.178	21 29 44.3	0.53	10 16 13.5	19 31 22.55	0.189	21 29 53.1	0.55	
11	19 31 21.05	0.195	21 29 57.5	0.57	11 16 9.5	19 31 17.82	0.205	21 30 6.9	0.59	
12	19 31 16.18	0.211	21 30 11.6	0.60	12 16 5.5	19 31 12.69	0.222	21 30 21.5	0.62	
13	19 31 10.91	0.228	21 30 26.5	0.64	13 16 1.4	19 31 7.17	0.238	21 30 36.9	0.66	
14	19 31 5.24	0.244	21 30 42.3	0.67	14 15 57.4	19 31 1.25	0.255	21 30 53.2	0.70	
15	19 30 59.18	0.261	21 30 58.9	0.71	15 15 53.4	19 30 54.94	0.271	21 31 10.4	0.73	
16	19 30 52.72	0.277	21 31 16.4	0.75	16 15 49.3	19 30 48.24	0.287	21 31 28.4	0.77	
17	19 30 45.87	0.293	21 31 34.8	0.78	17 15 45.3	19 30 41.17	0.302	21 31 47.2	0.80	
18	19 30 38.65	0.309	21 31 54.0	0.82	18 15 41.2	19 30 33.73	0.318	21 32 6.9	0.84	
19	19 30 31.06	0.324	21 32 14.0	0.85	19 15 37.2	19 30 25.92	0.333	21 32 27.4	0.87	
20	19 30 23.10	0.339	21 32 34.9	0.89	20 15 33.1	19 30 17.75	0.348	21 32 48.8	0.91	
21	19 30 14.78	0.354	21 32 56.6	0.92	21 15 29.0	19 30 9.22	0.363	21 33 11.0	0.94	
22	19 30 6.09	0.370	21 33 19.1	0.95	22 15 24.9	19 30 0.32	0.379	21 33 33.9	0.97	
23	19 29 57.03	0.385	21 33 42.3	0.98	23 15 20.8	19 29 51.05	0.394	21 33 57.5	1.00	
24	19 29 47.60	0.400	21 34 6.3	1.02	24 15 16.8	19 29 41.42	0.409	21 34 21.9	1.03	
25	19 29 37.81	0.415	21 34 31.1	1.05	25 15 12.7	19 29 31.43	0.423	21 34 47.1	1.06	
26	19 29 27.67	0.430	21 34 56.6	1.08	26 15 8.6	19 29 21.10	0.438	21 35 13.0	1.09	
27	19 29 17.19	0.444	21 35 22.8	1.11	27 15 4.4	19 29 10.43	0.452	21 35 39.6	1.12	
28	19 29 6.36	0.458	21 35 49.7	1.14	28 15 0.3	19 28 59.42	0.466	21 36 6.9	1.15	
29	19 28 55.19	0.472	21 36 17.3	1.17	29 14 56.2	19 28 48.08	0.479	21 36 34.9	1.18	
30	19 28 43.69	0.486	21 36 45.7	1.20	30 14 52.1	19 28 36.41	0.493	21 37 3.6	1.21	
31	19 28 31.87	0.499	21 37 14.8	1.23	31 14 48.0	19 28 24.41	0.507	21 37 33.0	1.24	
June 1	19 28 19.72	0.513	21 37 44.5	1.25	1 14 43.8	19 28 12.00	0.520	21 38 3.0	1.26	
2	19 28 7.25	0.526	21 38 14.8	1.28	2 14 39.7	19 27 59.46	0.533	21 38 33.6	1.29	
3	19 27 54.47	0.539	21 38 45.7	1.30	3 14 35.5	19 27 46.53	0.545	21 39 4.8	1.31	
4	19 27 41.38	0.552	21 39 17.2	1.33	4 14 31.4	19 27 33.30	0.557	21 39 36.6	1.34	
5	19 27 27.99	0.564	21 39 49.4	1.35	5 14 27.2	19 27 19.78	0.569	21 40 9.1	1.36	
6	19 27 14.31	0.576	21 40 22.2	1.38	6 14 23.1	19 27 5.97	0.581	21 40 42.1	1.39	
7	19 27 0.34	0.588	21 40 55.5	1.40	7 14 18.9	19 26 51.87	0.593	21 41 15.6	1.41	
8	19 26 46.09	0.600	21 41 29.3	1.42	8 14 14.7	19 26 37.49	0.605	21 41 49.6	1.43	
9	19 26 31.56	0.611	21 42 3.6	1.45	9 14 10.6	19 26 22.84	0.616	21 42 24.2	1.45	
10	19 26 16.76	0.622	21 42 38.5	1.46	10 14 6.4	19 26 7.94	0.626	21 42 59.3	1.47	
11	19 26 1.71	0.632	21 43 13.9	1.48	11 14 2.2	19 25 52.79	0.636	21 43 34.8	1.49	
12	19 25 46.42	0.642	21 43 49.7	1.50	12 13 58.0	19 25 37.40	0.646	21 44 10.7	1.51	
13	19 25 30.89	0.652	21 44 25.9	1.52	13 13 53.8	19 25 21.77	0.656	21 44 47.1	1.52	
14	19 25 15.12	0.662	21 45 2.5	1.54	14 13 49.6	19 25 5.92	0.665	21 45 23.9	1.54	
15	19 24 59.12	0.671	21 45 39.6	1.55	15 13 45.4	19 24 49.85	0.674	21 46 1.1	1.56	
16	19 24 42.90	0.680	21 46 17.1	1.57	16 13 41.2	19 24 33.56	0.683	21 46 38.6	1.57	
17	19 24 26.47	0.689	21 46 54.9	1.58	17 13 37.0	19 24 17.06	0.691	21 47 16.4	1.58	
18	19 24 9.84	0.697	21 47 33.0	1.59	18 13 32.8	19 24 0.37	0.699	21 47 54.6	1.60	
19	19 23 53.02	0.705	21 48 11.4	1.61	19 13 28.6	19 23 43.49	0.707	21 48 33.2	1.61	
20	19 23 36.01	0.712	21 48 50.2	1.62	20 13 24.4	19 23 26.43	0.715	21 49 12.1	1.62	
21	19 23 18.82	0.720	21 49 29.3	1.63	21 13 20.1	19 23 9.19	0.722	21 49 51.2	1.63	
22	19 23 1.46	0.727	21 50 8.6	1.64	22 13 15.9	19 22 51.78	0.729	21 50 30.5	1.64	
23	19 22 43.93	0.734	21 50 48.1	1.65	23 13 11.7	19 22 34.21	0.735	21 51 9.9	1.65	
24	19 22 26.24	0.740	21 51 27.8	1.66	24 13 7.5	19 22 16.49	0.741	21 51 49.5	1.65	
25	19 22 8.40	0.746	21 52 7.6	1.66	25 13 3.2	19 21 58.64	0.746	21 52 29.3	1.66	
26	19 21 50.43	0.751	21 52 47.6	1.67	26 12 59.0	19 21 40.66	0.752	21 53 9.3	1.67	
27	19 21 32.33	0.757	21 53 27.8	1.68	27 12 54.8	19 21 22.55	0.757	21 53 49.5	1.68	
28	19 21 14.11	0.761	21 54 8.2	1.69	28 12 50.5	19 21 4.32	0.762	21 54 29.9	1.69	
29	19 20 55.78	0.766	21 54 48.8	1.69	29 12 46.3	19 20 45.99	0.766	21 55 10.4	1.69	
30	19 20 37.35	0.770	21 55 29.5	1.70	30 12 42.1	19 20 27.56	0.770	21 55 51.0	1.69	
31	19 20 18.83	-0.774	-21 56 10.2	- 1.70	31 12 37.8	19 20 9.04	-0.773	-21 56 31.6	- 1.69	

Date. 1872.	FOR WASHINGTON MEAN NOON.				FOR MERIDIAN TRANSIT.				
	Apparent Right Ascension.	Diff. for 1 hour	Apparent Declination.	Diff. for 1 hour.	Mean Time of Transit.	Apparent Right Ascension.	Diff. for 1 h. of Long.	Apparent Declination.	Diff. for 1 hour of Long.
July 1	19 20 18.83	-0.774	21 56 10.2	-1.70	1 12 37.8	19 20 9.04	-0.773	21 56 31.6	-1.69
2	19 20 0.22	0.777	21 56 50.9	1.70	2 12 33.6	19 19 50.44	0.776	21 57 12.2	1.69
3	19 19 41.53	0.780	21 57 31.6	1.70	3 12 29.4	19 19 31.77	0.779	21 57 52.8	1.69
4	19 19 22.78	0.783	21 58 12.4	1.70	4 12 25.1	19 19 13.05	0.781	21 58 33.5	1.70
5	19 19 3.97	0.785	21 58 53.2	1.70	5 12 20.9	19 18 54.28	0.783	21 59 14.2	1.69
6	19 18 45.12	0.786	21 59 34.0	1.70	6 12 16.6	19 18 35.46	0.785	21 59 54.8	1.69
7	19 18 26.23	0.787	22 0 14.7	1.69	7 12 12.4	19 18 16.61	0.786	22 0 35.4	1.69
8	19 18 7.32	0.788	22 0 55.3	1.69	8 12 8.1	19 17 57.74	0.786	22 1 15.8	1.68
9	19 17 48.39	0.789	22 1 35.8	1.69	9 12 3.9	19 17 38.86	0.786	22 1 56.1	1.68
10	19 17 29.45	0.789	22 2 16.2	1.68	10 11 59.6	19 17 19.99	0.786	22 2 36.3	1.67
11	19 17 10.52	0.788	22 2 56.5	1.68	11 11 55.4	19 17 1.13	0.785	22 3 16.4	1.67
12	19 16 51.61	0.787	22 3 36.6	1.67	12 11 51.2	19 16 42.29	0.784	22 3 56.4	1.66
13	19 16 32.73	0.786	22 4 16.6	1.66	13 11 46.9	19 16 23.48	0.783	22 4 36.2	1.66
14	19 16 13.89	0.784	22 4 56.5	1.66	14 11 42.7	19 16 4.71	0.781	22 5 15.9	1.65
15	19 15 55.09	0.782	22 5 36.2	1.65	15 11 38.4	19 15 45.99	0.779	22 5 55.4	1.64
16	19 15 36.34	0.780	22 6 15.7	1.64	16 11 34.2	19 15 27.33	0.776	22 6 34.7	1.63
17	19 15 17.66	0.777	22 6 54.9	1.63	17 11 29.9	19 15 8.74	0.773	22 7 13.7	1.62
18	19 14 59.05	0.774	22 7 33.8	1.62	18 11 25.7	19 14 50.22	0.770	22 7 52.4	1.61
19	19 14 40.52	0.770	22 8 12.5	1.61	19 11 21.5	19 14 31.78	0.766	22 8 30.8	1.59
20	19 14 22.07	0.767	22 8 50.9	1.59	20 11 17.2	19 14 13.43	0.762	22 9 8.9	1.58
21	19 14 3.72	0.762	22 9 29.0	1.58	21 11 13.0	19 13 55.18	0.758	22 9 46.8	1.57
22	19 13 45.48	0.757	22 10 6.8	1.57	22 11 8.8	19 13 37.05	0.753	22 10 24.4	1.56
23	19 13 27.36	0.752	22 10 44.3	1.56	23 11 4.5	19 13 19.04	0.748	22 11 1.6	1.54
24	19 13 9.37	0.747	22 11 21.5	1.54	24 11 0.3	19 13 1.16	0.742	22 11 38.5	1.53
25	19 12 51.51	0.741	22 11 58.4	1.53	25 10 56.1	19 12 43.42	0.736	22 12 15.1	1.52
26	19 12 33.79	0.735	22 12 34.9	1.51	26 10 51.8	19 12 25.82	0.730	22 12 51.3	1.50
27	19 12 16.22	0.729	22 13 11.0	1.50	27 10 47.6	19 12 8.37	0.724	22 13 27.1	1.48
28	19 11 58.81	0.722	22 13 46.7	1.48	28 10 43.4	19 11 51.09	0.716	22 14 2.5	1.47
29	19 11 41.57	0.715	22 14 22.0	1.46	29 10 39.2	19 11 33.98	0.709	22 14 37.5	1.45
30	19 11 24.50	0.707	22 14 56.8	1.44	30 10 35.0	19 11 17.04	0.702	22 15 12.0	1.43
31	19 11 7.62	0.699	22 15 31.2	1.43	31 10 30.8	19 11 0.29	0.694	22 15 46.1	1.41
Aug. 1	19 10 50.94	0.691	22 16 5.2	1.41	1 10 26.6	19 10 43.75	0.685	22 16 19.8	1.40
2	19 10 34.47	0.682	22 16 38.8	1.39	2 10 22.4	19 10 27.42	0.676	22 16 53.1	1.38
3	19 10 18.22	0.673	22 17 12.0	1.37	3 10 18.2	19 10 11.31	0.666	22 17 26.0	1.36
4	19 10 2.19	0.663	22 17 44.7	1.35	4 10 14.0	19 9 55.43	0.657	22 17 58.5	1.34
5	19 9 46.39	0.653	22 18 16.9	1.33	5 10 9.8	19 9 39.78	0.647	22 18 30.4	1.32
6	19 9 30.83	0.643	22 18 48.6	1.31	6 10 5.6	19 9 24.37	0.637	22 19 1.8	1.30
7	19 9 15.52	0.633	22 19 19.8	1.29	7 10 1.4	19 9 9.21	0.626	22 19 32.7	1.28
8	19 9 0.46	0.622	22 19 50.5	1.27	8 9 57.2	19 8 54.30	0.616	22 20 3.1	1.26
9	19 8 45.66	0.611	22 20 20.7	1.25	9 9 53.0	19 8 39.65	0.605	22 20 33.0	1.24
10	19 8 31.13	0.600	22 20 50.4	1.22	10 9 48.9	19 8 25.27	0.593	22 21 2.4	1.21
11	19 8 16.88	0.588	22 21 19.5	1.20	11 9 44.7	19 8 11.18	0.581	22 21 31.2	1.19
12	19 8 2.92	0.576	22 21 48.1	1.18	12 9 40.5	19 7 57.38	0.569	22 21 59.5	1.17
13	19 7 49.25	0.563	22 22 16.2	1.16	13 9 36.4	19 7 43.87	0.557	22 22 27.3	1.15
14	19 7 35.88	0.551	22 22 43.8	1.14	14 9 32.2	19 7 30.65	0.545	22 22 54.6	1.12
15	19 7 22.81	0.538	22 23 10.8	1.11	15 9 28.1	19 7 17.73	0.532	22 23 21.3	1.10
16	19 7 10.05	0.525	22 23 37.2	1.09	16 9 24.0	19 7 5.13	0.518	22 23 47.4	1.08
17	19 6 57.61	0.512	22 24 3.0	1.06	17 9 19.8	19 6 52.85	0.505	22 24 12.9	1.05
18	19 6 45.49	0.498	22 24 28.2	1.04	18 9 15.7	19 6 40.89	0.492	22 24 37.8	1.03
19	19 6 33.68	0.485	22 24 52.8	1.01	19 9 11.6	19 6 29.25	0.478	22 25 2.1	1.00
20	19 6 22.20	0.471	22 25 16.9	0.99	20 9 7.4	19 6 17.93	0.465	22 25 25.9	0.98
21	19 6 11.06	0.457	22 25 40.4	0.97	21 9 3.3	19 6 6.95	0.450	22 25 49.1	0.95
22	19 6 0.27	0.442	22 26 3.3	0.94	22 8 59.2	19 5 56.32	0.436	22 26 11.7	0.93
23	19 5 49.83	0.428	22 26 25.6	0.92	23 8 55.1	19 5 46.04	0.421	22 26 33.7	0.91
24	19 5 39.74	0.413	22 26 47.3	0.89	24 8 51.0	19 5 36.11	0.406	22 26 55.2	0.88
25	19 5 30.01	0.398	22 27 8.4	0.87	25 8 46.9	19 5 26.54	0.391	22 27 16.1	0.86
26	19 5 20.64	0.383	22 27 28.9	0.84	26 8 42.9	19 5 17.33	0.376	22 27 36.3	0.83
27	19 5 11.63	0.368	22 27 48.8	0.82	27 8 38.8	19 5 8.48	0.361	22 27 55.9	0.80
28	19 5 2.99	0.352	22 28 8.1	0.79	28 8 34.7	19 4 59.99	0.346	22 28 14.9	0.78
29	19 4 54.72	0.337	22 28 26.8	0.77	29 8 30.6	19 4 51.88	0.330	22 28 33.3	0.75
30	19 4 46.83	0.321	22 28 44.9	0.74	30 8 26.6	19 4 44.15	0.314	22 28 51.1	0.73
31	19 4 39.33	-0.304	22 29 2.3	-0.71	31 8 22.5	19 4 36.81	-0.298	22 29 8.2	-0.70

Date. 1872.	FOR WASHINGTON MEAN NOON.				FOR MERIDIAN TRANSIT.				
	Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Mean Time of Transit.	Apparent Right Ascension.	Diff. for 1 h. of Long.	Apparent Declination.	Diff. for 1 hour of Long.
Sept. 1	h m s	s	° ' "	"	d h m	h m s	s	° ' "	"
1	19 4 32.23	-0.288	22 29 19.1	- 0.69	1 8 18.5	19 4 29.87	-0.281	22 29 24.7	- 0.67
2	19 4 25.53	0.271	22 29 35.2	0.66	2 8 14.4	19 4 23.32	0.265	22 29 40.5	0.65
3	19 4 19.22	0.255	22 29 50.6	0.63	3 8 10.4	19 4 17.16	0.248	22 29 55.7	0.62
4	19 4 13.31	0.238	22 30 5.4	0.60	4 8 6.4	19 4 11.40	0.232	22 30 10.3	0.59
5	19 4 7.80	0.221	22 30 19.6	0.58	5 8 2.3	19 4 6.04	0.215	22 30 24.2	0.57
6	19 4 2.70	0.204	22 30 33.2	0.55	6 7 58.3	19 4 1.09	0.198	22 30 37.5	0.54
7	19 3 58.00	0.187	22 30 46.1	0.52	7 7 54.3	19 3 56.54	0.181	22 30 50.2	0.52
8	19 3 53.71	0.170	22 30 58.4	0.50	8 7 50.3	19 3 52.40	0.164	22 31 2.3	0.49
9	19 3 49.84	0.152	22 31 10.1	0.47	9 7 46.3	19 3 48.68	0.146	22 31 13.7	0.46
10	19 3 46.39	0.135	22 31 21.1	0.44	10 7 42.3	19 3 45.37	0.129	22 31 24.4	0.43
11	19 3 43.36	0.118	22 31 31.4	0.42	11 7 38.3	19 3 42.48	0.112	22 31 34.5	0.41
12	19 3 40.74	0.100	22 31 41.1	0.39	12 7 34.4	19 3 40.00	0.095	22 31 44.0	0.38
13	19 3 38.54	0.083	22 31 50.1	0.36	13 7 30.4	19 3 37.94	0.077	22 31 52.8	0.35
14	19 3 36.76	0.065	22 31 58.5	0.34	14 7 26.5	19 3 36.29	0.060	22 32 0.9	0.32
15	19 3 35.40	0.048	22 32 6.2	0.31	15 7 22.5	19 3 35.06	0.043	22 32 8.4	0.30
16	19 3 34.46	0.030	22 32 13.3	0.28	16 7 18.6	19 3 34.25	0.025	22 32 15.3	0.27
17	19 3 33.94	-0.013	22 32 19.7	0.25	17 7 14.6	19 3 33.85	-0.008	22 32 21.5	0.25
18	19 3 33.83	+0.004	22 32 25.5	0.23	18 7 10.7	19 3 33.87	+0.010	22 32 27.1	0.22
19	19 3 34.14	0.022	22 32 30.6	0.20	19 7 6.8	19 3 34.31	0.027	22 32 32.0	0.19
20	19 3 34.88	0.040	22 32 35.1	0.17	20 7 2.9	19 3 35.18	0.045	22 32 36.3	0.16
21	19 3 36.05	0.058	22 32 38.9	0.14	21 6 58.9	19 3 36.48	0.063	22 32 39.9	0.14
22	19 3 37.66	0.076	22 32 42.0	0.11	22 6 55.0	19 3 38.21	0.081	22 32 42.8	0.11
23	19 3 39.70	0.094	22 32 44.4	0.09	23 6 51.1	19 3 40.36	0.098	22 32 45.0	0.08
24	19 3 42.16	0.111	22 32 46.2	0.06	24 6 47.3	19 3 42.93	0.116	22 32 46.6	0.05
25	19 3 45.04	0.129	22 32 47.3	- 0.03	25 6 43.4	19 3 45.92	0.133	22 32 47.5	- 0.02
26	19 3 48.34	0.146	22 32 47.7	0.00	26 6 39.5	19 3 49.33	0.151	22 32 47.7	0.00
27	19 3 52.06	0.164	22 32 47.5	+ 0.02	27 6 35.6	19 3 53.16	0.168	22 32 47.3	+ 0.03
28	19 3 56.21	0.182	22 32 46.6	0.05	28 6 31.8	19 3 57.41	0.186	22 32 46.2	0.06
29	19 4 0.79	0.200	22 32 45.0	0.08	29 6 27.9	19 4 2.09	0.204	22 32 44.4	0.09
30	19 4 5.79	0.217	22 32 42.8	0.11	30 6 24.1	19 4 7.20	0.222	22 32 42.0	0.11
Oct. 1	19 4 11.22	0.235	22 32 39.9	0.14	1 6 20.2	19 4 12.73	0.239	22 32 38.9	0.14
2	19 4 17.08	0.253	22 32 36.3	0.16	2 6 16.4	19 4 18.68	0.257	22 32 35.2	0.17
3	19 4 23.36	0.270	22 32 32.0	0.19	3 6 12.6	19 4 25.05	0.274	22 32 30.8	0.20
4	19 4 30.06	0.288	22 32 27.0	0.22	4 6 8.7	19 4 31.84	0.291	22 32 25.7	0.23
5	19 4 37.18	0.305	22 32 21.4	0.25	5 6 4.9	19 4 39.04	0.309	22 32 19.9	0.26
6	19 4 44.72	0.323	22 32 15.1	0.28	6 6 1.1	19 4 46.66	0.326	22 32 13.4	0.29
7	19 4 52.67	0.340	22 32 8.1	0.31	7 5 57.3	19 4 54.70	0.344	22 32 6.2	0.31
8	19 5 1.03	0.357	22 32 0.4	0.34	8 5 53.5	19 5 3.15	0.369	22 31 58.4	0.34
9	19 5 9.80	0.374	22 31 52.0	0.36	9 5 49.7	19 5 12.00	0.377	22 31 49.9	0.37
10	19 5 18.98	0.391	22 31 42.9	0.39	10 5 46.0	19 5 21.26	0.394	22 31 40.7	0.40
11	19 5 28.57	0.408	22 31 33.1	0.42	11 5 42.2	19 5 30.92	0.411	22 31 30.8	0.43
12	19 5 38.57	0.425	22 31 22.7	0.45	12 5 38.4	19 5 40.99	0.428	22 31 20.2	0.46
13	19 5 48.98	0.442	22 31 11.6	0.48	13 5 34.7	19 5 51.46	0.445	22 31 8.9	0.49
14	19 5 59.79	0.459	22 30 59.8	0.51	14 5 30.9	19 6 2.33	0.461	22 30 56.9	0.51
15	19 6 10.99	0.475	22 30 47.3	0.54	15 5 27.2	19 6 13.58	0.477	22 30 44.3	0.54
16	19 6 22.57	0.490	22 30 34.1	0.56	16 5 23.4	19 6 25.22	0.493	22 30 31.0	0.57
17	19 6 34.53	0.506	22 30 20.2	0.60	17 5 19.7	19 6 37.24	0.509	22 30 17.0	0.60
18	19 6 46.88	0.523	22 30 5.5	0.63	18 5 16.0	19 6 49.64	0.525	22 30 2.2	0.63
19	19 6 59.62	0.539	22 29 50.1	0.65	19 5 12.3	19 7 2.43	0.541	22 29 46.7	0.66
20	19 7 12.74	0.555	22 29 34.1	0.68	20 5 8.6	19 7 15.60	0.557	22 29 30.6	0.69
21	19 7 26.25	0.571	22 29 17.4	0.71	21 5 4.9	19 7 29.15	0.573	22 29 13.8	0.71
22	19 7 40.14	0.586	22 29 0.1	0.74	22 5 1.2	19 7 43.08	0.588	22 28 56.4	0.74
23	19 7 54.40	0.602	22 28 42.1	0.76	23 4 57.5	19 7 57.39	0.604	22 28 38.3	0.77
24	19 8 9.03	0.617	22 28 23.4	0.80	24 4 53.8	19 8 12.07	0.619	22 28 19.5	0.80
25	19 8 24.03	0.63	22 28 3.9	0.83	25 4 50.1	19 8 27.11	0.634	22 27 59.9	0.83
26	19 8 39.39	0.648	22 27 43.7	0.86	26 4 46.4	19 8 42.50	0.649	22 27 39.6	0.86
27	19 8 55.11	0.663	22 27 22.8	0.89	27 4 42.7	19 8 58.25	0.664	22 27 18.6	0.89
28	19 9 11.19	0.678	22 27 1.1	0.92	28 4 39.1	19 9 14.35	0.678	22 26 56.8	0.92
29	19 9 27.63	0.692	22 26 38.7	0.95	29 4 35.4	19 9 30.81	0.693	22 26 34.3	0.95
30	19 9 44.42	0.707	22 26 15.6	0.98	30 4 31.8	19 9 47.63	0.708	22 26 11.1	0.98
31	19 10 1.56	0.721	22 25 51.9	1.00	31 4 28.1	19 10 4.80	0.722	22 25 47.3	1.00
32	19 10 19.05	+0.736	22 25 27.5	+ 1.03	32 4 24.5	19 10 22.31	+0.737	22 25 22.9	+ 1.03

Date. 1872.	FOR WASHINGTON MEAN NOON.				FOR MERIDIAN TRANSIT.				
	Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Mean Time of Transit.	Apparent Right Ascension.	Diff. for 1 h. of Long.	Apparent Declination.	Diff. for 1 hour of Long.
Nov. 1	19 10 19.05	+0.736	-22 25 27.5	+ 1.03	1 4 24.5	19 10 22.31	+0.737	-22 25 22.9	+ 1.03
	2 19 10 36.89	0.750	22 25 2.4	1.06	2 4 20.8	19 10 40.16	0.751	22 24 57.8	1.06
	3 19 10 55.07	0.764	22 24 36.6	1.09	3 4 17.2	19 10 58.35	0.765	22 24 32.0	1.09
	4 19 11 13.58	0.778	22 24 10.0	1.12	4 4 13.6	19 11 16.87	0.778	22 24 5.4	1.13
	5 19 11 32.41	0.791	22 23 42.7	1.15	5 4 10.0	19 11 35.71	0.791	22 23 38.0	1.16
	6 19 11 51.55	0.804	22 23 14.7	1.18	6 4 6.4	19 11 54.86	0.804	22 23 9.9	1.19
	7 19 12 11.01	0.817	22 22 45.9	1.21	7 4 2.7	19 12 14.32	0.817	22 22 41.0	1.22
	8 19 12 30.78	0.830	22 22 16.4	1.24	8 3 59.1	19 12 34.09	0.830	22 22 11.4	1.25
	9 19 12 50.87	0.843	22 21 46.2	1.27	9 3 55.5	19 12 54.18	0.843	22 21 41.1	1.28
	10 19 13 11.27	0.856	22 21 15.3	1.30	10 3 51.9	19 13 14.58	0.856	22 21 10.2	1.30
	11 19 13 31.98	0.869	22 20 43.8	1.33	11 3 48.4	19 13 35.29	0.869	22 20 38.7	1.33
	12 19 13 52.99	0.881	22 20 11.6	1.36	12 3 44.8	19 13 56.29	0.881	22 20 6.5	1.36
	13 19 14 14.29	0.893	22 19 38.7	1.39	13 3 41.2	19 14 17.58	0.893	22 19 33.5	1.39
	14 19 14 35.87	0.905	22 19 5.0	1.42	14 3 37.6	19 14 39.15	0.905	22 18 59.8	1.42
	15 19 14 57.73	0.917	22 18 30.6	1.45	15 3 34.1	19 15 1.00	0.916	22 18 25.4	1.45
	16 19 15 19.87	0.928	22 17 55.5	1.48	16 3 30.5	19 15 23.13	0.927	22 17 50.3	1.48
	17 19 15 42.29	0.940	22 17 19.7	1.51	17 3 26.9	19 15 45.53	0.939	22 17 14.5	1.51
	18 19 16 4.98	0.951	22 16 43.2	1.54	18 3 23.4	19 16 8.20	0.950	22 16 38.0	1.54
	19 19 16 27.94	0.962	22 16 6.0	1.56	19 3 19.8	19 16 31.14	0.961	22 16 0.8	1.56
	20 19 16 51.16	0.973	22 15 28.1	1.59	20 3 16.3	19 16 54.34	0.972	22 15 22.9	1.59
	21 19 17 14.64	0.984	22 14 49.5	1.62	21 3 12.7	19 17 17.80	0.983	22 14 44.3	1.62
	22 19 17 38.37	0.994	22 14 10.2	1.65	22 3 9.2	19 17 41.51	0.993	22 14 5.0	1.65
	23 19 18 2.35	1.004	22 13 30.2	1.68	23 3 5.7	19 18 5.46	1.003	22 13 25.0	1.68
	24 19 18 26.57	1.014	22 12 49.5	1.71	24 3 2.1	19 18 29.65	1.013	22 12 44.3	1.71
	25 19 18 51.04	1.025	22 12 8.1	1.74	25 2 58.6	19 18 54.09	1.024	22 12 2.9	1.74
	26 19 19 15.76	1.035	22 11 26.0	1.77	26 2 55.1	19 19 18.78	1.034	22 11 20.8	1.77
	27 19 19 40.72	1.045	22 10 43.2	1.80	27 2 51.6	19 19 43.71	1.043	22 10 38.1	1.79
	28 19 20 5.91	1.054	22 9 59.7	1.83	28 2 48.1	19 20 8.86	1.052	22 9 54.7	1.82
	29 19 20 31.31	1.063	22 9 15.5	1.85	29 2 44.6	19 20 34.22	1.061	22 9 10.5	1.85
	30 19 20 56.92	1.071	22 8 30.7	1.88	30 2 41.1	19 20 59.79	1.070	22 8 25.7	1.88
Dec. 1	19 21 22.74	1.080	22 7 45.2	1.91	1 2 37.6	19 21 25.57	1.079	22 7 40.2	1.91
	2 19 21 48.76	1.089	22 6 59.0	1.94	2 2 34.1	19 21 51.56	1.087	22 6 54.0	1.94
	3 19 22 14.99	1.097	22 6 12.1	1.97	3 2 30.6	19 22 17.75	1.095	22 6 7.1	1.97
	4 19 22 41.42	1.105	22 5 24.6	1.99	4 2 27.1	19 22 44.14	1.104	22 5 19.6	1.99
	5 19 23 8.04	1.113	22 4 36.4	2.02	5 2 23.6	19 23 10.72	1.111	22 4 31.5	2.02
	6 19 23 34.85	1.121	22 3 47.5	2.05	6 2 20.1	19 23 37.48	1.119	22 3 42.7	2.05
	7 19 24 1.85	1.129	22 2 58.0	2.08	7 2 16.6	19 24 4.42	1.126	22 2 53.3	2.07
	8 19 24 29.02	1.136	22 2 7.8	2.10	8 2 13.1	19 24 31.54	1.134	22 2 3.2	2.10
	9 19 24 56.36	1.143	22 1 17.0	2.13	9 2 9.6	19 24 58.83	1.140	22 1 12.4	2.13
	10 19 25 23.86	1.149	22 0 25.6	2.16	10 2 6.2	19 25 26.28	1.147	22 0 21.0	2.15
	11 19 25 51.52	1.156	21 59 33.5	2.18	11 2 2.7	19 25 53.88	1.153	21 59 29.0	2.18
	12 19 26 19.33	1.162	21 58 40.8	2.21	12 1 59.2	19 26 21.64	1.160	21 58 36.4	2.20
	13 19 26 47.29	1.168	21 57 47.5	2.23	13 1 55.8	19 26 49.55	1.166	21 57 43.2	2.23
	14 19 27 15.39	1.174	21 56 53.6	2.26	14 1 52.3	19 27 17.60	1.172	21 56 49.3	2.26
	15 19 27 43.64	1.180	21 55 59.0	2.29	15 1 48.8	19 27 45.79	1.178	21 55 54.8	2.28
	16 19 28 12.04	1.186	21 55 3.8	2.31	16 1 45.4	19 28 14.13	1.184	21 54 59.7	2.31
	17 19 28 40.58	1.192	21 54 8.0	2.34	17 1 41.9	19 28 42.63	1.189	21 54 4.0	2.33
	18 19 29 9.24	1.197	21 53 11.6	2.36	18 1 38.4	19 29 11.20	1.194	21 53 7.7	2.36
	19 19 29 38.02	1.201	21 52 14.6	2.39	19 1 35.0	19 29 39.92	1.199	21 52 10.8	2.38
	20 19 30 6.91	1.206	21 51 17.1	2.41	20 1 31.5	19 30 8.75	1.204	21 51 13.4	2.40
	21 19 30 35.91	1.211	21 50 19.0	2.43	21 1 28.1	19 30 37.69	1.208	21 50 15.5	2.43
	22 19 31 5.02	1.215	21 49 20.4	2.45	22 1 24.6	19 31 6.73	1.212	21 49 17.0	2.45
	23 19 31 34.94	1.220	21 48 21.2	2.48	23 1 21.2	19 31 35.88	1.217	21 48 17.9	2.48
	24 19 32 3.56	1.224	21 47 21.4	2.50	24 1 17.7	19 32 5.14	1.221	21 47 18.2	2.50
	25 19 32 32.98	1.228	21 46 21.1	2.53	25 1 14.3	19 32 34.49	1.225	21 46 18.0	2.52
	26 19 33 2.49	1.231	21 45 20.2	2.55	26 1 10.8	19 33 3.94	1.229	21 45 17.2	2.54
	27 19 33 32.08	1.235	21 44 18.8	2.57	27 1 7.4	19 33 33.47	1.232	21 44 15.9	2.56
	28 19 34 1.75	1.238	21 43 16.9	2.59	28 1 4.0	19 34 3.07	1.235	21 43 14.1	2.59
	29 19 34 31.49	1.241	21 42 14.5	2.61	29 1 0.5	19 34 32.74	1.238	21 42 11.8	2.61
	30 19 35 1.30	1.243	21 41 11.6	2.63	30 0 57.1	19 35 2.48	1.241	21 41 9.0	2.63
	31 19 35 31.17	1.246	21 40 8.1	2.66	31 0 53.7	19 35 32.29	1.243	21 40 5.7	2.65
	32 19 36 1.10	+1.248	-21 39 4.1	+ 2.68	32 0 50.2	19 36 2.15	+1.245	-21 39 1.9	+ 2.67

Date.	FOR WASHINGTON MEAN NOON.					FOR MERIDIAN TRANSIT.				
	Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Mean Time of Transit.	Apparent Right Ascension.	Diff. for 1 h. of Long.	Apparent Declination.	Diff. for 1 hour of Long.	
1872.										
Jan. 0	h m s 12.58	-0.416	+20 44 17.5	+ 1.32	d h m s 0 13 23.2	h m s 9.697	-0.418	+20 44 35.3	+ 1.32	
1	8 9 2.55	0.419	20 44 49.3	1.33	1 13 24.1	8 8 56.93	0.421	20 45 7.1	1.34	
2	8 8 52.42	0.424	20 45 21.4	1.34	2 13 20.0	8 8 46.76	0.425	20 45 39.2	1.35	
3	8 8 42.20	0.428	20 45 53.7	1.35	3 13 15.9	8 8 36.52	0.428	20 46 11.5	1.35	
4	8 8 31.90	0.431	20 46 26.1	1.35	4 13 11.8	8 8 26.20	0.431	20 46 44.0	1.36	
5	8 8 21.52	0.434	20 46 58.7	1.36	5 13 7.7	8 8 15.81	0.434	20 47 16.5	1.36	
6	8 8 11.06	0.437	20 47 31.4	1.36	6 13 3.6	8 8 5.34	0.437	20 47 49.2	1.37	
7	8 8 0.53	0.440	20 48 4.2	1.37	7 12 59.4	8 7 54.83	0.440	20 48 22.0	1.37	
8	8 7 49.04	0.442	20 48 37.2	1.38	8 12 55.3	8 7 44.21	0.442	20 48 54.9	1.38	
9	8 7 39.33	0.445	20 49 10.3	1.38	9 12 51.2	8 7 33.57	0.445	20 49 28.0	1.38	
10	8 7 28.60	0.447	20 49 43.4	1.38	10 12 47.1	8 7 22.88	0.447	20 50 1.1	1.38	
11	8 7 17.84	0.449	20 50 16.7	1.38	11 12 43.0	8 7 12.13	0.449	20 50 34.2	1.39	
12	8 7 7.05	0.450	20 50 49.9	1.39	12 12 38.9	8 7 1.34	0.451	20 51 7.4	1.39	
13	8 6 56.21	0.452	20 51 23.2	1.39	13 12 34.8	8 6 50.51	0.453	20 51 40.7	1.39	
14	8 6 45.34	0.453	20 51 56.6	1.39	14 12 30.7	8 6 39.66	0.454	20 52 13.9	1.39	
15	8 6 34.44	0.455	20 52 29.9	1.39	15 12 26.6	8 6 28.78	0.455	20 52 47.1	1.39	
16	8 6 23.51	0.456	20 53 3.2	1.39	16 12 22.4	8 6 17.87	0.456	20 53 20.3	1.39	
17	8 6 12.57	0.456	20 53 36.5	1.38	17 12 18.3	8 6 6.95	0.456	20 53 53.5	1.38	
18	8 6 1.62	0.456	20 54 9.7	1.38	18 12 14.2	8 5 56.03	0.456	20 54 26.6	1.38	
19	8 5 50.67	0.456	20 54 42.9	1.38	19 12 10.1	8 5 45.11	0.456	20 54 59.6	1.38	
20	8 5 39.71	0.456	20 55 15.9	1.38	20 12 6.0	8 5 34.18	0.456	20 55 32.5	1.38	
21	8 5 28.75	0.455	20 55 48.9	1.37	21 12 1.9	8 5 23.26	0.455	20 56 5.4	1.37	
22	8 5 17.81	0.455	20 56 21.8	1.37	22 11 57.8	8 5 12.35	0.455	20 56 38.1	1.37	
23	8 5 6.87	0.455	20 56 54.6	1.36	23 11 53.7	8 5 1.45	0.455	20 57 10.7	1.36	
24	8 4 55.96	0.454	20 57 27.2	1.36	24 11 49.6	8 4 50.57	0.454	20 57 43.2	1.36	
25	8 4 45.06	0.453	20 57 59.7	1.35	25 11 45.4	8 4 39.72	0.452	20 58 15.5	1.35	
26	8 4 34.19	0.452	20 58 32.0	1.34	26 11 41.3	8 4 28.90	0.451	20 58 47.6	1.34	
27	8 4 23.36	0.451	20 59 4.1	1.33	27 11 37.2	8 4 18.12	0.450	20 59 19.5	1.33	
28	8 4 12.55	0.450	20 59 36.1	1.33	28 11 33.1	8 4 7.36	0.449	20 59 51.3	1.32	
29	8 4 1.78	0.448	21 0 7.8	1.32	29 11 29.0	8 3 56.64	0.447	21 0 22.9	1.32	
30	8 3 51.06	0.446	21 0 39.3	1.31	30 11 24.9	8 3 45.98	0.445	21 0 54.2	1.31	
Feb. 1	8 3 40.39	0.443	21 1 10.6	1.30	31 11 20.8	8 3 35.37	0.442	21 1 25.3	1.30	
2	8 3 29.77	0.441	21 1 41.7	1.29	1 11 16.6	8 3 24.81	0.440	21 1 56.2	1.29	
3	8 3 19.22	0.439	21 2 12.5	1.28	2 11 12.5	8 3 14.32	0.438	21 2 26.8	1.28	
4	8 3 8.73	0.436	21 2 43.0	1.27	3 11 8.4	8 3 3.89	0.435	21 2 57.1	1.26	
5	8 2 58.31	0.433	21 3 13.3	1.25	4 11 4.3	8 2 53.54	0.431	21 3 27.1	1.25	
6	8 2 47.96	0.429	21 3 43.2	1.24	5 11 0.2	8 2 43.26	0.428	21 3 56.8	1.24	
7	8 2 37.69	0.426	21 4 12.8	1.23	6 10 56.1	8 2 33.06	0.424	21 4 26.2	1.22	
8	8 2 27.51	0.422	21 4 42.1	1.21	7 10 52.0	8 2 22.95	0.420	21 4 55.3	1.20	
9	8 2 17.42	0.418	21 5 11.1	1.20	8 10 47.9	8 2 12.93	0.416	21 5 24.0	1.19	
10	8 2 7.43	0.414	21 5 39.7	1.18	9 10 43.8	8 2 3.01	0.412	21 5 52.4	1.18	
11	8 1 57.53	0.410	21 6 8.0	1.17	10 10 39.7	8 1 53.19	0.408	21 6 20.5	1.16	
12	8 1 47.74	0.406	21 6 35.9	1.15	11 10 35.7	8 1 43.47	0.404	21 6 48.1	1.15	
13	8 1 38.06	0.401	21 7 3.4	1.14	12 10 31.6	8 1 33.86	0.399	21 7 15.4	1.13	
14	8 1 28.49	0.396	21 7 30.6	1.12	13 10 27.5	8 1 24.36	0.394	21 7 42.3	1.12	
15	8 1 19.03	0.392	21 7 57.3	1.11	14 10 23.4	8 1 14.98	0.390	21 8 8.8	1.10	
16	8 1 9.69	0.387	21 8 23.7	1.09	15 10 19.3	8 1 5.72	0.385	21 8 34.9	1.08	
17	8 1 0.48	0.381	21 8 49.6	1.07	16 10 15.2	8 0 56.59	0.379	21 9 0.6	1.06	
18	8 0 51.40	0.376	21 9 15.1	1.05	17 10 11.1	8 0 47.59	0.374	21 9 25.8	1.04	
19	8 0 42.45	0.370	21 9 40.1	1.03	18 10 7.1	8 0 38.72	0.368	21 9 50.6	1.02	
20	8 0 33.63	0.365	21 10 4.7	1.01	19 10 3.0	8 0 29.99	0.363	21 10 14.9	1.00	
21	8 0 24.95	0.359	21 10 28.8	0.99	20 9 58.9	8 0 21.40	0.357	21 10 38.7	0.98	
22	8 0 16.42	0.353	21 10 52.4	0.97	21 9 54.8	8 0 12.95	0.350	21 11 2.1	0.96	
23	8 0 8.03	0.346	21 11 15.6	0.95	22 9 50.8	8 0 4.65	0.343	21 11 25.0	0.94	
24	7 59 59.79	0.340	21 11 38.3	0.93	23 9 46.7	7 59 56.50	0.337	21 11 47.4	0.92	
25	7 59 51.71	0.333	21 12 0.5	0.91	24 9 42.6	7 59 48.51	0.331	21 12 9.4	0.90	
26	7 59 42.79	0.327	21 12 22.3	0.89	25 9 38.6	7 59 40.68	0.324	21 12 30.8	0.88	
27	7 59 36.03	0.320	21 12 43.4	0.87	26 9 34.5	7 59 33.00	0.317	21 12 51.7	0.86	
28	7 59 28.43	0.313	21 13 4.1	0.85	27 9 30.4	7 59 25.49	0.310	21 13 12.1	0.84	
29	7 59 20.99	0.306	21 13 24.3	0.83	28 9 26.4	7 59 18.14	0.303	21 13 32.1	0.82	
30	7 59 13.73	0.299	21 13 43.9	0.81	29 9 22.3	7 59 10.96	0.296	21 13 51.4	0.80	
31	7 59 6.64	-0.292	+21 14 3.0	+ 0.78	30 9 18.3	7 59 3.96	-0.289	+21 14 10.3	+ 0.77	

# URANUS, 1872.

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Date. 1872.	FOR WASHINGTON MEAN NOON.					FOR MERIDIAN TRANSIT.				
	Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.		Mean Time of Transit.	Apparent Right Ascension.	Diff. for 1 h. of Long.	Apparent Declination.	Diff. for 1 hour of Long.
	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>"</sup>	<sup>°</sup> <sup>'</sup> <sup>''</sup>	<sup>''</sup>		<sup>d</sup> <sup>h</sup> <sup>m</sup>	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>"</sup>	<sup>°</sup> <sup>'</sup> <sup>''</sup>	<sup>''</sup>
Mar. 1	7 59 6.64	-0.292	+21 14 3.0	+ 0.78		1 9 18.3	7 59 3.96	-0.289	+21 14 16.3	+ 0.77
2	7 58 59.72	0.284	21 14 21.5	0.76		2 9 14.3	7 58 57.12	0.281	21 14 28.5	0.75
3	7 58 52.98	0.277	21 14 39.5	0.74		3 9 10.2	7 58 50.46	0.274	21 14 46.3	0.73
4	7 58 46.43	0.270	21 14 57.0	0.71		4 9 6.2	7 58 43.99	0.267	21 15 3.5	0.70
5	7 58 40.66	0.262	21 15 13.9	0.69		5 9 2.1	7 58 37.71	0.259	21 15 20.1	0.68
6	7 58 33.87	0.254	21 15 30.2	0.67		6 8 58.1	7 58 31.62	0.251	21 15 36.2	0.66
7	7 58 27.83	0.246	21 15 45.9	0.64		7 8 54.1	7 58 25.71	0.242	21 15 51.6	0.63
8	7 58 22.08	0.237	21 16 1.1	0.62		8 8 50.1	7 58 20.00	0.234	21 16 6.5	0.61
9	7 58 16.48	0.229	21 16 15.6	0.60		9 8 46.0	7 58 14.49	0.226	21 16 20.8	0.59
10	7 58 11.07	0.221	21 16 29.6	0.57		10 8 42.0	7 58 9.17	0.218	21 16 34.6	0.56
11	7 58 5.87	0.213	21 16 43.0	0.55		11 8 38.0	7 58 4.05	0.210	21 16 47.7	0.54
12	7 58 0.86	0.204	21 16 55.8	0.52		12 8 34.0	7 57 59.13	0.201	21 17 0.3	0.51
13	7 57 56.06	0.196	21 17 8.1	0.50		13 8 30.0	7 57 54.41	0.193	21 17 12.3	0.49
14	7 57 51.47	0.187	21 17 19.7	0.47		14 8 26.0	7 57 49.91	0.184	21 17 23.6	0.46
15	7 57 47.09	0.178	21 17 30.7	0.45		15 8 22.0	7 57 45.61	0.175	21 17 34.4	0.44
16	7 57 42.91	0.170	21 17 41.1	0.42		16 8 18.0	7 57 41.52	0.167	21 17 44.5	0.41
17	7 57 38.95	0.161	21 17 50.9	0.40		17 8 14.0	7 57 37.65	0.158	21 17 54.1	0.39
18	7 57 35.29	0.152	21 18 0.0	0.37		18 8 10.0	7 57 33.99	0.149	21 18 3.0	0.36
19	7 57 31.67	0.143	21 18 8.6	0.34		19 8 6.0	7 57 30.54	0.140	21 18 11.3	0.33
20	7 57 28.36	0.133	21 18 16.5	0.32		20 8 2.0	7 57 27.31	0.130	21 18 19.0	0.31
21	7 57 25.26	0.124	21 18 23.8	0.29		21 7 58.0	7 57 24.29	0.121	21 18 26.1	0.28
22	7 57 22.38	0.115	21 18 30.5	0.26		22 7 54.0	7 57 21.49	0.112	21 18 32.5	0.25
23	7 57 19.73	0.106	21 18 36.5	0.24		23 7 50.1	7 57 18.92	0.103	21 18 38.3	0.23
24	7 57 17.29	0.097	21 18 41.9	0.21		24 7 46.1	7 57 16.56	0.094	21 18 43.5	0.20
25	7 57 15.08	0.088	21 18 46.7	0.19		25 7 42.1	7 57 14.43	0.085	21 18 48.1	0.18
26	7 57 13.09	0.078	21 18 50.9	0.16		26 7 38.1	7 57 12.52	0.075	21 18 52.1	0.15
27	7 57 11.32	0.069	21 18 54.4	0.13		27 7 34.2	7 57 10.82	0.066	21 18 55.4	0.12
28	7 57 9.77	0.060	21 18 57.2	0.10		28 7 30.2	7 57 9.35	0.057	21 18 58.0	0.09
29	7 57 8.44	0.050	21 18 59.5	0.08		29 7 26.3	7 57 8.09	0.047	21 19 0.0	0.07
30	7 57 7.34	0.041	21 19 1.1	0.05		30 7 22.3	7 57 7.06	0.038	21 19 1.3	0.04
31	7 57 6.46	0.032	21 19 2.0	+ 0.03		31 7 18.4	7 57 6.25	0.029	21 19 2.1	+ 0.02
Apr. 1	7 57 5.82	0.022	21 19 2.3	0.00		1 7 14.5	7 57 5.68	0.019	21 19 2.2	- 0.01
2	7 57 5.40	0.013	21 19 2.1	- 0.02		2 7 10.5	7 57 5.32	-0.010	21 19 1.9	0.03
3	7 57 5.20	-0.003	21 19 1.1	0.05		3 7 6.6	7 57 5.19	0.000	21 19 0.7	0.06
4	7 57 5.23	+0.006	21 18 59.6	0.08		4 7 2.7	7 57 5.28	+0.009	21 18 58.9	0.09
5	7 57 5.49	0.015	21 18 57.4	0.10		5 6 58.7	7 57 5.61	0.018	21 18 56.6	0.11
6	7 57 5.98	0.025	21 18 54.6	0.13		6 6 54.8	7 57 6.17	0.028	21 18 53.6	0.14
7	7 57 6.70	0.035	21 18 51.1	0.16		7 6 50.9	7 57 6.95	0.038	21 18 50.0	0.16
8	7 57 7.65	0.044	21 18 46.9	0.18		8 6 47.0	7 57 7.96	0.047	21 18 45.7	0.19
9	7 57 8.83	0.054	21 18 42.2	0.21		9 6 43.1	7 57 9.20	0.057	21 18 40.8	0.22
10	7 57 10.23	0.063	21 18 36.7	0.24		10 6 39.2	7 57 10.66	0.066	21 18 35.2	0.25
11	7 57 11.86	0.073	21 18 30.7	0.26		11 6 35.2	7 57 12.33	0.076	21 18 29.0	0.27
12	7 57 13.72	0.082	21 18 24.0	0.29		12 6 31.4	7 57 14.27	0.085	21 18 22.2	0.30
13	7 57 15.80	0.092	21 18 16.7	0.32		13 6 27.5	7 57 16.41	0.094	21 18 14.7	0.32
14	7 57 18.11	0.101	21 18 8.8	0.34		14 6 23.6	7 57 18.77	0.103	21 18 6.6	0.35
15	7 57 20.65	0.110	21 18 0.2	0.37		15 6 19.7	7 57 21.36	0.112	21 17 57.9	0.38
16	7 57 23.42	0.120	21 17 51.1	0.40		16 6 15.8	7 57 24.18	0.122	21 17 48.6	0.41
17	7 57 26.41	0.129	21 17 41.3	0.43		17 6 11.9	7 57 27.22	0.131	21 17 38.7	0.44
18	7 57 29.62	0.136	21 17 30.9	0.47		18 6 8.0	7 57 30.48	0.139	21 17 28.1	0.47
19	7 57 33.05	0.147	21 17 19.8	0.49		19 6 4.2	7 57 33.96	0.149	21 17 16.9	0.49
20	7 57 36.70	0.157	21 17 8.2	0.50		20 6 0.3	7 57 37.66	0.159	21 17 5.1	0.51
21	7 57 40.57	0.166	21 16 55.9	0.53		21 5 56.4	7 57 41.57	0.168	21 16 52.8	0.53
22	7 57 44.66	0.175	21 16 43.0	0.55		22 5 52.6	7 57 45.70	0.177	21 16 39.8	0.55
23	7 57 48.96	0.183	21 16 29.5	0.57		23 5 48.7	7 57 50.04	0.186	21 16 26.2	0.58
24	7 57 53.49	0.193	21 16 15.5	0.60		24 5 44.9	7 57 54.61	0.195	21 16 12.0	0.60
25	7 57 58.23	0.202	21 16 0.8	0.62		25 5 41.0	7 57 59.39	0.204	21 15 57.2	0.63
26	7 58 3.18	0.211	21 15 45.5	0.65		26 5 37.2	7 58 4.38	0.213	21 15 41.8	0.65
27	7 58 8.35	0.220	21 15 29.6	0.67		27 5 33.3	7 58 9.58	0.222	21 15 25.9	0.63
28	7 58 13.72	0.228	21 15 13.1	0.70		28 5 29.5	7 58 14.99	0.230	21 15 9.3	0.70
29	7 58 19.30	0.237	21 14 56.1	0.72		29 5 25.6	7 58 20.60	0.239	21 14 52.1	0.73
30	7 58 25.10	0.246	21 14 38.4	0.75		30 5 21.8	7 58 26.43	0.248	21 14 34.3	0.75
31	7 58 31.10	+0.254	+21 14 20.1	- 0.77		31 5 18.0	7 58 32.46	+0.256	+21 14 16.0	- 0.77



Date. 1872.	FOR WASHINGTON MEAN NOON.				FOR MERIDIAN TRANSIT.					
	Apparent Right Ascension.	Diff. for 1 hour	Apparent Declination.	Diff. for 1 hour.	Mean Time of Transit.	Apparent Right Ascension.	Diff. for 1 h. of Long.	Apparent Declination.	Diff. for 1 hour of Long.	
May 1	<sup>h</sup> 7 <sup>m</sup> 58 <sup>s</sup> 31.10	+0.254	+21 14 23.1	- 0.77	<sup>d</sup> 1 <sup>h</sup> 5 <sup>m</sup> 18.0	<sup>h</sup> 7 <sup>m</sup> 58 <sup>s</sup> 32.46	+0.256	+21 14 16.0	- 0.77	
2	7 58 37.30	0.263	21 14 1.3	0.80	2 5 14.2	7 58 38.69	0.265	21 13 57.1	0.80	
3	7 58 43.71	0.271	21 13 41.9	0.82	3 5 10.3	7 58 45.13	0.273	21 13 37.6	0.82	
4	7 58 50.32	0.280	21 13 21.9	0.84	4 5 6.5	7 58 51.77	0.282	21 13 17.6	0.84	
5	7 58 57.14	0.288	21 13 1.3	0.87	5 5 2.7	7 58 58.61	0.290	21 12 57.0	0.87	
6	7 59 4.16	0.297	21 12 40.2	0.89	6 4 58.8	7 59 5.65	0.299	21 12 35.8	0.89	
7	7 59 11.38	0.305	21 12 18.5	0.92	7 4 55.0	7 59 12.89	0.307	21 12 14.0	0.92	
8	7 59 18.80	0.313	21 11 56.2	0.94	8 4 51.2	7 59 20.33	0.315	21 11 51.7	0.94	
9	7 59 26.41	0.321	21 11 33.4	0.96	9 4 47.4	7 59 27.96	0.323	21 11 28.8	0.96	
10	7 59 34.22	0.329	21 11 10.0	0.98	10 4 43.6	7 59 35.79	0.331	21 11 5.4	0.98	
11	7 59 42.22	0.337	21 10 46.1	1.01	11 4 39.8	7 59 43.81	0.339	21 10 41.4	1.01	
12	7 59 50.42	0.345	21 10 21.6	1.03	12 4 36.0	7 59 52.02	0.347	21 10 16.9	1.03	
13	7 59 58.80	0.353	21 9 56.6	1.05	13 4 32.2	8 0 0.41	0.356	21 9 51.8	1.05	
14	8 0 7.36	0.361	21 9 31.0	1.07	14 4 28.4	8 0 8.98	0.363	21 9 26.2	1.07	
15	8 0 16.11	0.368	21 9 4.9	1.09	15 4 24.7	8 0 17.74	0.370	21 9 0.1	1.09	
16	8 0 25.04	0.376	21 8 38.3	1.12	16 4 20.9	8 0 26.68	0.377	21 8 33.4	1.12	
17	8 0 34.15	0.383	21 8 11.1	1.14	17 4 17.1	8 0 35.79	0.384	21 8 6.2	1.14	
18	8 0 43.43	0.390	21 7 43.4	1.16	18 4 13.3	8 0 45.08	0.391	21 7 38.5	1.16	
19	8 0 52.88	0.397	21 7 15.2	1.18	19 4 9.6	8 0 54.53	0.398	21 7 10.3	1.18	
20	8 1 2.51	0.405	21 6 46.5	1.21	20 4 5.8	8 1 4.16	0.406	21 6 41.6	1.21	
21	8 1 12.30	0.412	21 6 17.3	1.23	21 4 2.0	8 1 13.96	0.413	21 6 12.4	1.23	
22	8 1 22.27	0.418	21 5 47.6	1.25	22 3 58.3	8 1 23.93	0.419	21 5 42.6	1.25	
23	8 1 32.39	0.425	21 5 17.4	1.27	23 3 54.5	8 1 34.05	0.426	21 5 12.4	1.27	
24	8 1 42.69	0.432	21 4 46.7	1.29	24 3 50.7	8 1 44.34	0.433	21 4 41.7	1.29	
25	8 1 53.14	0.439	21 4 15.5	1.31	25 3 47.0	8 1 54.80	0.440	21 4 10.5	1.31	
26	8 2 3.75	0.445	21 3 43.8	1.33	26 3 43.2	8 2 5.41	0.446	21 3 38.8	1.33	
27	8 2 14.52	0.452	21 3 11.6	1.35	27 3 39.5	8 2 16.18	0.453	21 3 6.7	1.35	
28	8 2 25.45	0.458	21 2 39.0	1.37	28 3 35.7	8 2 27.10	0.459	21 2 34.1	1.37	
29	8 2 36.53	0.465	21 2 5.9	1.39	29 3 32.0	8 2 38.17	0.466	21 2 1.0	1.39	
30	8 2 47.75	0.471	21 1 32.3	1.41	30 3 28.2	8 2 49.39	0.472	21 1 27.4	1.41	
31	8 2 59.12	0.477	21 0 58.3	1.43	31 3 24.5	8 3 0.75	0.478	21 0 53.4	1.43	
June 1	8 3 10.64	0.482	21 0 23.8	1.44	1 3 20.8	8 3 12.26	0.483	21 0 19.0	1.44	
2	8 3 22.30	0.488	20 59 48.9	1.46	2 3 17.0	8 3 23.91	0.489	20 59 44.1	1.46	
3	8 3 34.10	0.494	20 59 13.6	1.48	3 3 13.3	8 3 35.70	0.495	20 59 8.8	1.48	
4	8 3 46.04	0.500	20 58 37.8	1.50	4 3 9.6	8 3 47.62	0.501	20 58 33.1	1.50	
5	8 3 58.11	0.506	20 58 1.6	1.52	5 3 5.8	8 3 59.68	0.506	20 57 56.9	1.52	
6	8 4 10.32	0.511	20 57 25.0	1.53	6 3 2.1	8 4 11.88	0.511	20 57 20.3	1.53	
7	8 4 22.66	0.517	20 56 47.9	1.55	7 2 58.3	8 4 24.20	0.517	20 56 43.3	1.55	
8	8 4 35.13	0.522	20 56 10.4	1.57	8 2 54.6	8 4 36.66	0.522	20 56 5.8	1.57	
9	8 4 47.72	0.527	20 55 32.6	1.59	9 2 50.9	8 4 49.23	0.527	20 55 28.0	1.59	
10	8 5 0.43	0.532	20 54 54.3	1.60	10 2 47.2	8 5 1.92	0.532	20 54 49.8	1.60	
11	8 5 13.27	0.537	20 54 15.7	1.62	11 2 43.5	8 5 14.74	0.537	20 54 11.2	1.62	
12	8 5 26.22	0.542	20 53 36.6	1.63	12 2 39.8	8 5 27.67	0.542	20 53 32.3	1.63	
13	8 5 39.28	0.547	20 52 57.2	1.65	13 2 36.0	8 5 40.71	0.547	20 52 52.9	1.65	
14	8 5 52.46	0.551	20 52 17.4	1.66	14 2 32.3	8 5 53.86	0.552	20 52 13.2	1.66	
15	8 6 5.74	0.555	20 51 37.3	1.68	15 2 28.6	8 6 7.12	0.556	20 51 33.1	1.67	
16	8 6 19.12	0.560	20 50 56.8	1.70	16 2 24.9	8 6 20.48	0.560	20 50 52.7	1.69	
17	8 6 32.61	0.564	20 50 15.9	1.71	17 2 21.2	8 6 33.94	0.564	20 50 11.9	1.71	
18	8 6 46.20	0.568	20 49 34.7	1.72	18 2 17.5	8 6 47.50	0.568	20 49 30.7	1.72	
19	8 6 59.88	0.572	20 48 53.1	1.74	19 2 13.8	8 7 1.16	0.572	20 48 49.3	1.74	
20	8 7 13.66	0.576	20 48 11.3	1.75	20 2 10.1	8 7 14.91	0.575	20 48 7.5	1.75	
21	8 7 27.53	0.580	20 47 29.1	1.76	21 2 6.4	8 7 28.75	0.579	20 47 25.3	1.76	
22	8 7 41.49	0.583	20 46 46.5	1.78	22 2 2.7	8 7 42.68	0.583	20 46 42.9	1.78	
23	8 7 55.54	0.587	20 46 3.7	1.79	23 1 59.0	8 7 56.70	0.586	20 46 0.1	1.79	
24	8 8 9.66	0.590	20 45 20.5	1.80	24 1 55.3	8 8 10.79	0.590	20 45 17.1	1.80	
25	8 8 23.87	0.594	20 44 37.1	1.82	25 1 51.6	8 8 24.97	0.593	20 44 33.7	1.82	
26	8 8 38.16	0.597	20 43 53.3	1.83	26 1 47.9	8 8 39.23	0.596	20 43 50.0	1.83	
27	8 8 52.54	0.600	20 43 9.2	1.84	27 1 44.2	8 8 53.58	0.599	20 43 6.0	1.84	
28	8 9 6.98	0.603	20 42 24.9	1.85	28 1 40.5	8 9 7.99	0.602	20 42 21.8	1.85	
29	8 9 21.50	0.606	20 41 40.2	1.86	29 1 36.8	8 9 22.48	0.605	20 41 37.2	1.86	
30	8 9 36.09	0.609	20 40 55.4	1.87	30 1 33.1	8 9 37.03	0.608	20 40 52.5	1.87	
31	8 9 50.74	+0.612	+20 40 10.2	- 1.88	31 1 29.4	8 9 51.65	+0.611	+20 40 7.4	- 1.88	

Date. 1872.	FOR WASHINGTON MEAN NOON.				FOR MERIDIAN TRANSIT.				
	Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Mean Time of Transit.	Apparent Right Ascension.	Diff. for 1 h. of Long.	Apparent Declination.	Diff. for 1 hour of Long.
July 1	8 9 50.74	+0.612	+20 40 10.2	- 1.88	1 1 29.4	8 9 51.65	+0.611	+20 40 7.4	- 1.88
2	8 10 5.45	0.614	20 39 24.9	1.90	2 1 25.7	8 10 6.33	0.614	20 39 22.2	1.90
3	8 10 20.23	0.617	20 38 39.3	1.91	3 1 22.1	8 10 21.07	0.616	20 38 36.7	1.91
4	8 10 35.06	0.619	20 37 53.5	1.91	4 1 18.4	8 10 35.87	0.618	20 37 51.0	1.91
5	8 10 49.94	0.621	20 37 7.4	1.92	5 1 14.7	8 10 50.71	0.620	20 37 5.0	1.92
6	8 11 4.87	0.623	20 36 21.1	1.93	6 1 11.0	8 11 5.61	0.622	20 36 18.8	1.93
7	8 11 19.86	0.625	20 35 34.6	1.94	7 1 7.3	8 11 20.56	0.624	20 35 32.5	1.94
8	8 11 34.89	0.627	20 34 47.9	1.95	8 1 3.6	8 11 35.56	0.626	20 34 45.9	1.95
9	8 11 49.96	0.629	20 34 1.0	1.96	9 1 0.0	8 11 50.59	0.628	20 33 59.1	1.96
10	8 12 5.07	0.630	20 33 14.0	1.96	10 0 56.3	8 12 5.66	0.630	20 33 12.2	1.96
11	8 12 20.22	0.632	20 32 26.7	1.97	11 0 52.6	8 12 20.78	0.631	20 32 25.0	1.97
12	8 12 35.40	0.633	20 31 39.3	1.98	12 0 48.9	8 12 35.92	0.632	20 31 37.7	1.98
13	8 12 50.61	0.634	20 30 51.8	1.98	13 0 45.2	8 12 51.09	0.633	20 30 50.3	1.98
14	8 13 5.85	0.635	20 30 4.1	1.99	14 0 41.6	8 13 6.29	0.634	20 30 2.7	1.99
15	8 13 21.11	0.636	20 29 16.3	2.00	15 0 37.9	8 13 21.51	0.635	20 29 15.0	2.00
16	8 13 36.39	0.637	20 28 28.3	2.00	16 0 34.2	8 13 36.75	0.636	20 28 27.2	2.00
17	8 13 51.70	0.638	20 27 40.2	2.01	17 0 30.5	8 13 52.02	0.637	20 27 39.2	2.01
18	8 14 7.02	0.639	20 26 52.0	2.01	18 0 26.8	8 14 7.30	0.638	20 26 51.1	2.01
19	8 14 22.35	0.639	20 26 3.6	2.02	19 0 23.2	8 14 22.59	0.638	20 26 2.9	2.02
20	8 14 37.70	0.639	20 25 15.2	2.02	20 0 19.5	8 14 37.90	0.638	20 25 14.5	2.02
21	8 14 53.05	0.640	20 24 26.7	2.02	21 0 15.8	8 14 53.22	0.639	20 24 26.1	2.02
22	8 15 8.41	0.640	20 23 38.1	2.03	22 0 12.2	8 15 8.54	0.639	20 23 37.7	2.02
23	8 15 23.77	0.640	20 22 49.4	2.03	23 0 8.5	8 15 23.86	0.639	20 22 49.1	2.03
24	8 15 39.13	0.640	20 22 0.7	2.03	24 0 4.8	8 15 39.18	0.639	20 22 0.5	2.03
25	8 15 54.48	0.640	20 21 11.9	2.03	25 0 1.1	8 15 54.49	0.639	20 21 11.9	2.03
26	8 16 9.84	0.640	20 20 23.0	2.04	26 23 57.4	8 16 9.80	0.639	20 20 23.1	2.03
27	8 16 25.18	0.639	20 19 34.2	2.04	27 23 53.8	8 16 25.11	0.638	20 19 34.4	2.04
28	8 16 40.52	0.639	20 18 45.3	2.04	28 23 50.1	8 16 40.41	0.638	20 18 45.6	2.04
29	8 16 55.84	0.638	20 17 56.3	2.04	29 23 46.4	8 16 55.69	0.637	20 17 56.8	2.04
30	8 17 11.14	0.637	20 17 7.4	2.04	30 23 42.7	8 17 10.96	0.636	20 17 8.0	2.04
31	8 17 26.43	0.636	20 16 18.5	2.04	31 23 39.0	8 17 26.21	0.635	20 16 19.2	2.04
Aug. 1	8 17 41.69	0.635	20 15 29.6	2.04	31 23 35.4	8 17 41.43	0.634	20 15 30.5	2.03
2	8 17 56.93	0.634	20 14 40.7	2.03	1 23 31.7	8 17 56.63	0.633	20 14 41.7	2.04
3	8 18 12.14	0.633	20 13 51.9	2.03	2 23 28.0	8 18 11.80	0.632	20 13 53.0	2.03
4	8 18 27.31	0.631	20 13 3.1	2.03	3 23 24.3	8 18 26.93	0.630	20 12 4.3	2.03
5	8 18 42.45	0.630	20 12 14.3	2.03	4 23 20.6	8 18 42.03	0.629	20 12 15.7	2.03
6	8 18 57.55	0.629	20 11 25.6	2.03	5 23 17.0	8 18 57.09	0.628	20 11 27.1	2.02
7	8 19 12.62	0.627	20 10 37.0	2.02	6 23 13.3	8 19 12.12	0.626	20 10 38.6	2.02
8	8 19 27.63	0.625	20 9 48.4	2.02	7 23 9.6	8 19 27.10	0.624	20 9 50.1	2.02
9	8 19 42.61	0.623	20 9 0.0	2.02	8 23 5.9	8 19 42.05	0.622	20 9 1.8	2.01
10	8 19 57.53	0.621	20 8 11.6	2.01	9 23 2.2	8 19 56.94	0.620	20 8 13.5	2.01
11	8 20 12.40	0.619	20 7 23.4	2.01	10 22 58.6	8 20 11.77	0.618	20 7 25.4	2.00
12	8 20 27.22	0.616	20 6 35.2	2.00	11 22 54.9	8 20 26.54	0.616	20 6 37.4	2.00
13	8 20 41.97	0.614	20 5 47.2	2.00	12 22 51.2	8 20 41.26	0.613	20 5 49.5	1.99
14	8 20 56.67	0.611	20 4 59.4	1.99	13 22 47.5	8 20 55.93	0.610	20 5 1.8	1.99
15	8 21 11.30	0.608	20 4 11.7	1.98	14 22 43.8	8 21 10.52	0.608	20 4 14.3	1.98
16	8 21 25.87	0.605	20 3 24.2	1.97	15 22 40.1	8 21 25.06	0.605	20 3 26.9	1.97
17	8 21 40.37	0.603	20 2 36.9	1.97	16 22 36.4	8 21 39.52	0.603	20 2 39.7	1.96
18	8 21 54.80	0.600	20 1 49.8	1.96	17 22 32.7	8 21 53.92	0.600	20 1 52.6	1.96
19	8 22 9.15	0.597	20 1 2.8	1.95	18 22 29.0	8 22 8.24	0.597	20 1 5.8	1.95
20	8 22 23.43	0.593	20 0 16.1	1.94	19 22 25.3	8 22 22.49	0.593	20 0 19.2	1.94
21	8 22 37.63	0.590	19 59 29.6	1.93	20 22 21.6	8 22 36.66	0.590	19 59 32.7	1.93
22	8 22 51.75	0.586	19 58 43.3	1.92	21 22 17.9	8 22 50.75	0.586	19 58 46.5	1.92
23	8 23 5.78	0.583	19 57 57.2	1.91	22 22 14.2	8 23 4.75	0.583	19 58 0.6	1.91
24	8 23 19.72	0.579	19 57 11.4	1.90	23 22 10.5	8 23 18.66	0.579	19 57 14.9	1.90
25	8 23 33.58	0.575	19 56 25.8	1.89	24 22 6.8	8 23 32.40	0.575	19 56 29.4	1.89
26	8 23 47.35	0.572	19 55 40.5	1.88	25 22 3.1	8 23 46.23	0.572	19 55 44.2	1.88
27	8 24 1.02	0.568	19 54 55.5	1.87	26 21 59.4	8 23 59.87	0.568	19 54 59.2	1.87
28	8 24 14.59	0.563	19 54 10.7	1.86	27 21 55.7	8 24 13.42	0.563	19 54 14.6	1.86
29	8 24 28.06	0.559	19 53 26.3	1.84	28 21 52.0	8 24 26.87	0.559	19 53 30.2	1.84
30	8 24 41.43	0.555	19 52 42.2	1.83	29 21 48.3	8 24 40.21	0.555	19 52 46.2	1.83
31	8 24 54.70	+0.550	+19 51 58.4	- 1.82	30 21 44.6	8 24 53.45	0.550	19 52 5.5	1.82
					31 21 40.9	8 25 6.58	+0.546	+19 51 19.1	- 1.80

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Sept. 1	8 25 7.85	+0.546	+19 51' 14.9"	- 1.80	1 21 37.1	8 25 19.60	+0.541	+19 50' 36.0"	- 1.79	
2	8 25 20.89	0.541	19 50 31.8	1.79	2 21 33.4	8 25 32.50	0.536	19 49 53.3	1.77	
3	8 25 33.81	0.536	19 49 49.0	1.77	3 21 29.7	8 25 45.28	0.531	19 49 11.0	1.76	
4	8 25 46.61	0.531	19 49 6.6	1.76	4 21 26.0	8 25 57.94	0.526	19 48 29.0	1.74	
5	8 25 59.29	0.526	19 48 24.5	1.74	5 21 22.2	8 26 10.48	0.521	19 47 47.4	1.73	
6	8 26 11.85	0.521	19 47 42.9	1.73	6 21 18.5	8 26 22.90	0.515	19 47 6.2	1.71	
7	8 26 24.29	0.515	19 47 1.6	1.71	7 21 14.8	8 26 35.19	0.510	19 46 25.4	1.70	
8	8 26 36.69	0.510	19 46 20.7	1.70	8 21 11.1	8 26 47.34	0.505	19 45 45.0	1.68	
9	8 26 48.77	0.505	19 45 40.3	1.68	9 21 7.3	8 26 59.37	0.499	19 45 5.1	1.66	
10	8 27 0.81	0.499	19 45 0.3	1.66	10 21 3.6	8 27 11.26	0.493	19 44 25.6	1.64	
11	8 27 12.71	0.493	19 44 20.8	1.64	11 20 59.9	8 27 23.01	0.487	19 43 46.5	1.62	
12	8 27 24.48	0.487	19 43 41.6	1.62	12 20 56.1	8 27 34.62	0.481	19 43 7.9	1.60	
13	8 27 36.10	0.481	19 43 3.0	1.60	13 20 52.4	8 27 46.09	0.475	19 42 29.8	1.58	
14	8 27 47.58	0.475	19 42 24.8	1.58	14 20 48.6	8 27 57.42	0.469	19 41 52.1	1.56	
15	8 27 58.92	0.469	19 41 47.1	1.56	15 20 44.9	8 28 8.60	0.463	19 41 14.9	1.54	
16	8 28 10.11	0.463	19 41 9.9	1.54	16 20 41.1	8 28 19.63	0.457	19 40 38.3	1.52	
17	8 28 21.15	0.457	19 40 33.2	1.52	17 20 37.4	8 28 30.51	0.450	19 40 2.1	1.50	
18	8 28 32.03	0.450	19 39 57.0	1.50	18 20 33.6	8 28 41.23	0.444	19 39 26.4	1.47	
19	8 28 42.76	0.444	19 39 21.4	1.47	19 20 29.9	8 28 51.80	0.437	19 38 51.3	1.45	
20	8 28 53.33	0.437	19 38 46.2	1.45	20 20 26.1	8 29 2.20	0.430	19 38 16.7	1.43	
21	8 29 3.74	0.430	19 38 11.6	1.43	21 20 22.4	8 29 12.45	0.424	19 37 42.7	1.41	
22	8 29 13.99	0.424	19 37 37.6	1.41	22 20 18.6	8 29 22.54	0.417	19 37 9.2	1.38	
23	8 29 24.08	0.417	19 37 4.1	1.38	23 20 14.8	8 29 32.46	0.410	19 36 36.3	1.36	
24	8 29 34.00	0.410	19 36 31.2	1.36	24 20 11.1	8 29 42.22	0.403	19 36 3.9	1.33	
25	8 29 43.76	0.403	19 35 58.8	1.33	25 20 7.3	8 29 51.81	0.396	19 35 32.2	1.31	
26	8 29 53.34	0.396	19 35 27.1	1.31	26 20 3.5	8 30 1.23	0.388	19 35 1.0	1.28	
27	8 30 2.76	0.388	19 34 56.0	1.28	27 19 59.7	8 30 10.47	0.381	19 34 30.5	1.26	
28	8 30 11.99	0.381	19 34 25.4	1.26	28 19 55.9	8 30 19.53	0.374	19 34 0.5	1.23	
29	8 30 21.05	0.374	19 33 55.5	1.23	29 19 52.3	8 30 28.41	0.366	19 33 31.2	1.21	
30	8 30 29.93	0.366	19 33 26.2	1.21	30 19 48.4	8 30 37.12	0.358	19 33 2.5	1.18	
Oct. 1	8 30 38.63	0.358	19 32 57.5	1.18	1 19 44.6	8 30 45.64	0.351	19 32 34.4	1.16	
2	8 30 47.14	0.351	19 32 29.5	1.16	2 19 40.8	8 30 53.98	0.343	19 32 7.0	1.13	
3	8 30 55.47	0.343	19 32 2.1	1.13	3 19 37.0	8 31 2.12	0.335	19 31 40.2	1.10	
4	8 31 3.60	0.335	19 31 35.4	1.10	4 19 33.2	8 31 10.07	0.327	19 31 14.1	1.07	
5	8 31 11.54	0.327	19 31 9.3	1.07	5 19 29.4	8 31 17.84	0.319	19 30 48.7	1.04	
6	8 31 19.29	0.319	19 30 44.0	1.04	6 19 25.6	8 31 25.42	0.311	19 30 23.9	1.01	
7	8 31 26.85	0.311	19 30 19.3	1.01	7 19 21.8	8 31 32.80	0.302	19 29 59.8	0.99	
8	8 31 34.20	0.302	19 29 55.3	0.99	8 19 18.0	8 31 39.98	0.294	19 29 36.5	0.96	
9	8 31 41.37	0.294	19 29 32.0	0.96	9 19 14.1	8 31 46.96	0.286	19 29 13.8	0.93	
10	8 31 48.33	0.286	19 29 9.3	0.93	10 19 10.3	8 31 53.74	0.278	19 28 51.8	0.90	
11	8 31 55.09	0.277	19 28 47.4	0.90	11 19 6.5	8 32 0.32	0.270	19 28 30.5	0.87	
12	8 32 1.64	0.269	19 28 26.2	0.87	12 19 2.7	8 32 6.69	0.261	19 28 9.9	0.84	
13	8 32 7.99	0.260	19 28 5.8	0.84	13 18 58.9	8 32 12.87	0.253	19 27 50.1	0.80	
14	8 32 14.14	0.252	19 27 46.1	0.80	14 18 55.0	8 32 18.85	0.244	19 27 31.1	0.78	
15	8 32 20.09	0.243	19 27 27.1	0.78	15 18 51.2	8 32 24.61	0.235	19 27 12.7	0.74	
16	8 32 25.82	0.234	19 27 8.9	0.74	16 18 47.3	8 32 30.17	0.227	19 26 55.2	0.71	
17	8 32 31.35	0.226	19 26 51.5	0.71	17 18 43.5	8 32 35.51	0.218	19 26 38.4	0.67	
18	8 32 36.66	0.217	19 26 34.8	0.67	18 18 39.7	8 32 40.64	0.209	19 26 22.3	0.65	
19	8 32 41.76	0.208	19 26 18.8	0.65	19 18 35.8	8 32 45.56	0.200	19 26 7.0	0.62	
20	8 32 46.65	0.199	19 26 3.7	0.62	20 18 32.0	8 32 50.27	0.191	19 25 52.4	0.59	
21	8 32 51.32	0.190	19 25 49.2	0.59	21 18 28.1	8 32 54.77	0.182	19 25 38.6	0.55	
22	8 32 55.78	0.181	19 25 35.6	0.55	22 18 24.3	8 32 59.06	0.173	19 25 25.6	0.52	
23	8 33 0.03	0.172	19 25 22.7	0.52	23 18 20.4	8 33 3.13	0.164	19 25 13.3	0.49	
24	8 33 4.05	0.163	19 25 10.5	0.49	24 18 16.5	8 33 6.97	0.155	19 25 1.9	0.45	
25	8 33 7.86	0.154	19 24 59.3	0.45	25 18 12.6	8 33 10.59	0.145	19 24 51.2	0.42	
26	8 33 11.43	0.144	19 24 48.8	0.42	26 18 8.7	8 33 13.99	0.136	19 24 41.4	0.39	
27	8 33 14.79	0.135	19 24 39.1	0.39	27 18 4.9	8 33 17.17	0.127	19 24 32.3	0.35	
28	8 33 17.92	0.126	19 24 30.2	0.35	28 18 1.0	8 33 20.13	0.117	19 24 24.1	0.32	
29	8 33 20.83	0.116	19 24 22.2	0.32	29 17 57.1	8 33 22.87	0.108	19 24 16.6	0.29	
30	8 33 23.51	0.107	19 24 14.9	0.29	30 17 53.2	8 33 25.38	0.099	19 24 9.9	0.25	
31	8 33 25.98	0.098	19 24 8.4	0.25	31 17 49.3	8 33 27.67	0.089	19 24 4.1	0.22	
32	8 33 28.21	+0.088	+19 24 2.7	- 0.22	32 17 45.4	8 33 29.73	+0.080	+19 23 59.1	- 0.20	

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Nov. 1	<sup>h</sup> 8 <sup>m</sup> 33 <sup>s</sup> 28.21	+0.088	+19° 24' 2.7	- 0.22	<sup>d</sup> 1 <sup>h</sup> 17 <sup>m</sup> 45.4	<sup>h</sup> 8 <sup>m</sup> 33 <sup>s</sup> 29.73	+0.080	+19° 23' 59.1	- 0.20
2	8 33 30.23	0.079	19 23 58.0	0.18	2 17 41.5	8 33 31.56	0.071	19 23 55.0	0.17
3	8 33 32.01	0.070	19 23 54.1	0.15	3 17 37.6	8 33 33.16	0.061	19 23 51.6	0.13
4	8 33 33.56	0.060	19 23 50.9	0.11	4 17 33.7	8 33 34.54	0.051	19 23 49.1	0.10
5	8 33 34.88	0.050	19 23 48.6	0.08	5 17 29.8	8 33 35.70	0.042	19 23 47.4	0.07
6	8 33 35.98	0.041	19 23 47.1	0.05	6 17 25.9	8 33 36.63	0.033	19 23 46.5	- 0.03
7	8 33 36.85	0.031	19 23 46.4	- 0.01	7 17 22.0	8 33 37.33	0.024	19 23 46.4	0.00
8	8 33 37.49	0.022	19 23 46.5	+ 0.02	8 17 18.0	8 33 37.81	0.014	19 23 47.1	+ 0.03
9	8 33 37.91	0.012	19 23 47.4	0.05	9 17 14.1	8 33 38.06	+0.005	19 23 48.6	0.07
10	8 33 38.10	+0.003	19 23 49.2	0.09	10 17 10.2	8 33 38.08	-0.004	19 23 50.9	0.10
11	8 33 38.06	-0.006	19 23 51.7	0.12	11 17 6.3	8 33 37.88	0.014	19 23 54.0	0.14
12	8 33 37.79	0.016	19 23 55.1	0.16	12 17 2.3	8 33 37.45	0.023	19 23 58.0	0.17
13	8 33 37.30	0.025	19 23 59.3	0.19	13 16 58.4	8 33 36.81	0.032	19 24 2.7	0.21
14	8 33 36.59	0.034	19 24 4.3	0.23	14 16 54.4	8 33 35.94	0.041	19 24 8.3	0.24
15	8 33 35.65	0.044	19 24 10.1	0.26	15 16 50.5	8 33 34.84	0.050	19 24 14.7	0.27
16	8 33 34.48	0.053	19 24 16.8	0.29	16 16 46.5	8 33 33.52	0.059	19 24 21.8	0.31
17	8 33 33.09	0.062	19 24 24.1	0.32	17 16 42.5	8 33 31.98	0.069	19 24 29.7	0.35
18	8 33 31.48	0.072	19 24 32.4	0.36	18 16 38.6	8 33 30.21	0.078	19 24 38.5	0.39
19	8 33 29.64	0.081	19 24 41.4	0.40	19 16 34.6	8 33 28.23	0.087	19 24 48.0	0.43
20	8 33 27.58	0.090	19 24 51.1	0.44	20 16 30.6	8 33 26.02	0.096	19 24 58.2	0.45
21	8 33 25.31	0.099	19 25 1.7	0.46	21 16 26.7	8 33 23.59	0.106	19 25 9.4	0.48
22	8 33 22.80	0.109	19 25 13.1	0.49	22 16 22.7	8 33 20.94	0.115	19 25 21.3	0.51
23	8 33 20.07	0.118	19 25 25.3	0.52	23 16 18.7	8 33 18.07	0.124	19 25 34.0	0.55
24	8 33 17.13	0.127	19 25 38.3	0.56	24 16 14.7	8 33 14.98	0.133	19 25 47.5	0.58
25	8 33 13.96	0.136	19 25 52.1	0.59	25 16 10.7	8 33 11.68	0.142	19 26 1.8	0.61
26	8 33 10.58	0.145	19 26 6.6	0.62	26 16 6.8	8 33 8.16	0.151	19 26 16.7	0.64
27	8 33 6.98	0.154	19 26 21.8	0.65	27 16 2.8	8 33 4.42	0.160	19 26 32.5	0.67
28	8 33 3.16	0.163	19 26 37.8	0.68	28 15 58.8	8 33 0.48	0.169	19 26 48.9	0.70
29	8 32 59.14	0.172	19 26 54.6	0.71	29 15 54.8	8 32 56.33	0.178	19 27 6.1	0.73
30	8 32 54.91	0.181	19 27 12.0	0.74	30 15 50.8	8 32 51.97	0.186	19 27 23.9	0.76
Dec. 1	8 32 50.47	0.189	19 27 30.2	0.77	1 15 46.8	8 32 47.40	0.195	19 27 42.6	0.79
2	8 32 45.82	0.198	19 27 49.1	0.80	2 15 42.7	8 32 42.62	0.204	19 28 1.9	0.82
3	8 32 40.96	0.207	19 28 8.7	0.83	3 15 38.7	8 32 37.64	0.212	19 28 22.0	0.85
4	8 32 35.90	0.215	19 28 29.1	0.86	4 15 34.7	8 32 32.48	0.220	19 28 42.7	0.88
5	8 32 30.65	0.223	19 28 50.1	0.89	5 15 30.7	8 32 27.11	0.228	19 29 4.1	0.91
6	8 32 25.23	0.231	19 29 11.8	0.92	6 15 26.7	8 32 21.55	0.236	19 29 26.2	0.93
7	8 32 19.55	0.239	19 29 34.2	0.94	7 15 22.6	8 32 15.80	0.244	19 29 48.9	0.96
8	8 32 13.71	0.247	19 29 57.2	0.97	8 15 18.6	8 32 9.86	0.252	19 30 12.2	0.99
9	8 32 7.68	0.255	19 30 20.8	1.00	9 15 14.6	8 32 3.73	0.260	19 30 36.2	1.01
10	8 32 1.47	0.263	19 30 45.1	1.02	10 15 10.5	8 31 57.40	0.267	19 31 0.8	1.04
11	8 31 55.07	0.270	19 31 10.0	1.05	11 15 6.5	8 31 50.90	0.275	19 31 26.0	1.06
12	8 31 48.48	0.278	19 31 35.5	1.07	12 15 2.5	8 31 44.22	0.283	19 31 51.9	1.09
13	8 31 41.71	0.286	19 32 1.6	1.10	13 14 58.4	8 31 37.36	0.290	19 32 18.3	1.11
14	8 31 34.77	0.293	19 32 28.3	1.12	14 14 54.4	8 31 30.34	0.297	19 32 45.3	1.14
15	8 31 27.66	0.300	19 32 55.6	1.15	15 14 50.3	8 31 23.13	0.304	19 33 12.8	1.16
16	8 31 20.37	0.307	19 33 23.4	1.17	16 14 46.3	8 31 15.76	0.311	19 33 40.9	1.18
17	8 31 12.92	0.314	19 33 51.8	1.19	17 14 42.2	8 31 8.23	0.318	19 34 9.5	1.20
18	8 31 5.31	0.320	19 34 20.7	1.21	18 14 38.1	8 31 0.54	0.324	19 34 38.6	1.23
19	8 30 57.53	0.327	19 34 50.1	1.24	19 14 34.1	8 30 52.70	0.330	19 35 8.2	1.25
20	8 30 49.60	0.334	19 35 20.0	1.26	20 14 30.0	8 30 44.70	0.336	19 35 38.3	1.27
21	8 30 41.52	0.340	19 35 50.4	1.28	21 14 25.9	8 30 36.54	0.342	19 36 9.0	1.29
22	8 30 33.28	0.346	19 36 21.3	1.30	22 14 21.9	8 30 28.23	0.349	19 36 40.1	1.31
23	8 30 24.89	0.353	19 36 52.7	1.32	23 14 17.8	8 30 19.77	0.355	19 37 11.7	1.33
24	8 30 16.35	0.358	19 37 24.6	1.34	24 14 13.7	8 30 11.18	0.360	19 37 43.7	1.34
25	8 30 7.68	0.364	19 37 56.9	1.35	25 14 9.6	8 30 2.45	0.366	19 38 16.1	1.36
26	8 29 58.87	0.370	19 38 29.6	1.37	26 14 5.6	8 29 53.58	0.371	19 38 49.0	1.38
27	8 29 49.92	0.375	19 39 2.7	1.39	27 14 1.5	8 29 44.59	0.376	19 39 22.2	1.39
28	8 29 40.85	0.380	19 39 36.2	1.40	28 13 57.4	8 29 35.48	0.381	19 39 55.8	1.41
29	8 29 31.66	0.385	19 40 10.0	1.42	29 13 53.3	8 29 26.24	0.386	19 40 29.7	1.42
30	8 29 22.34	0.390	19 40 44.2	1.43	30 13 49.2	8 29 16.89	0.391	19 41 4.0	1.43
31	8 29 12.91	0.395	19 41 18.7	1.44	31 13 45.2	8 29 7.43	0.396	19 41 38.6	1.45
32	8 29 3.37	-0.400	+19 41 53.6	+ 1.46	32 13 41.1	8 28 57.87	-0.401	+19 42 13.5	+ 1.46

Date. 1872.	FOR WASHINGTON MEAN NOON.				FOR MERIDIAN TRANSIT.				
	Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Mean Time of Transit.	Apparent Right Ascension.	Diff. for 1 h. of Long.	Apparent Declination.	Diff. for 1 hour of Long.
Jan. 1	h m s 1 21 11.42	-0.005	+ 6 42 47.1	+ 0.12	d h m 1 6 37.4	1 21 11.40	-0.003	+ 6 42 47.9	+ 0.13
2	1 21 11.37	0.000	6 42 50.4	0.15	2 6 33.5	1 21 11.38	+0.002	6 42 51.4	0.16
3	1 21 11.45	+0.006	6 42 54.5	0.19	3 6 29.6	1 21 11.50	0.007	6 42 55.7	0.20
4	1 21 11.65	0.011	6 42 59.4	0.22	4 6 25.7	1 21 11.74	0.013	6 43 0.8	0.23
5	1 21 11.99	0.017	6 43 5.1	0.25	5 6 21.7	1 21 12.10	0.018	6 43 6.7	0.26
6	1 21 12.45	0.022	6 43 11.5	0.28	6 6 17.8	1 21 12.60	0.024	6 43 13.3	0.29
7	1 21 13.05	0.028	6 43 18.7	0.32	7 6 13.9	1 21 13.23	0.029	6 43 20.7	0.33
8	1 21 13.78	0.033	6 43 26.7	0.35	8 6 9.9	1 21 13.99	0.034	6 43 28.9	0.36
9	1 21 14.64	0.039	6 43 35.5	0.39	9 6 6.0	1 21 14.88	0.040	6 43 37.9	0.39
10	1 21 15.63	0.044	6 43 45.2	0.42	10 6 2.1	1 21 15.90	0.045	6 43 47.7	0.43
11	1 21 16.75	0.050	6 43 55.6	0.45	11 5 58.2	1 21 17.06	0.051	6 43 58.3	0.46
12	1 21 18.01	0.055	6 44 6.7	0.48	12 5 54.3	1 21 18.34	0.056	6 44 9.6	0.49
13	1 21 19.39	0.060	6 44 18.6	0.51	13 5 50.4	1 21 19.75	0.062	6 44 21.7	0.52
14	1 21 20.91	0.066	6 44 31.3	0.55	14 5 46.5	1 21 21.30	0.067	6 44 34.5	0.55
15	1 21 22.55	0.071	6 44 44.8	0.58	15 5 42.6	1 21 22.97	0.072	6 44 48.1	0.58
16	1 21 24.33	0.077	6 44 59.1	0.61	16 5 38.7	1 21 24.77	0.078	6 45 2.5	0.62
17	1 21 26.23	0.082	6 45 14.1	0.64	17 5 34.8	1 21 26.70	0.083	6 45 17.6	0.65
18	1 21 28.26	0.088	6 45 29.8	0.67	18 5 30.9	1 21 28.75	0.088	6 45 33.5	0.68
19	1 21 30.42	0.093	6 45 46.3	0.70	19 5 27.0	1 21 30.93	0.094	6 45 50.2	0.71
20	1 21 32.71	0.098	6 46 3.6	0.74	20 5 23.1	1 21 33.24	0.099	6 46 7.6	0.74
21	1 21 35.12	0.103	6 46 21.7	0.77	21 5 19.2	1 21 35.67	0.104	6 46 25.8	0.77
22	1 21 37.66	0.108	6 46 40.5	0.80	22 5 15.3	1 21 38.23	0.109	6 46 44.7	0.80
23	1 21 40.32	0.113	6 47 0.0	0.83	23 5 11.4	1 21 40.91	0.114	6 47 4.3	0.83
24	1 21 43.11	0.119	6 47 20.2	0.86	24 5 7.5	1 21 43.72	0.120	6 47 24.6	0.86
25	1 21 46.02	0.124	6 47 41.1	0.89	25 5 3.6	1 21 46.65	0.125	6 47 45.6	0.89
26	1 21 49.06	0.129	6 48 2.8	0.92	26 4 59.8	1 21 49.71	0.130	6 48 7.4	0.92
27	1 21 52.22	0.134	6 48 25.2	0.96	27 4 55.9	1 21 52.89	0.135	6 48 29.9	0.95
28	1 21 55.50	0.139	6 48 48.3	0.98	28 4 52.0	1 21 56.19	0.140	6 48 53.1	0.98
29	1 21 58.90	0.144	6 49 12.1	1.01	29 4 48.1	1 21 59.60	0.145	6 49 17.0	1.01
30	1 22 2.43	0.149	6 49 36.6	1.03	30 4 44.2	1 22 3.13	0.150	6 49 41.5	1.04
31	1 22 6.07	0.154	6 50 1.8	1.06	31 4 40.4	1 22 6.79	0.155	6 50 6.7	1.06
Feb. 1	1 22 9.83	0.159	6 50 27.6	1.09	1 4 36.5	1 22 10.56	0.160	6 50 32.6	1.09
2	1 22 13.71	0.164	6 50 54.1	1.12	2 4 32.6	1 22 14.46	0.165	6 50 59.2	1.12
3	1 22 17.71	0.169	6 51 21.3	1.15	3 4 28.8	1 22 18.47	0.169	6 51 26.5	1.15
4	1 22 21.82	0.174	6 51 49.2	1.18	4 4 24.9	1 22 22.59	0.174	6 51 54.4	1.18
5	1 22 26.05	0.179	6 52 17.7	1.20	5 4 21.1	1 22 26.83	0.179	6 52 23.0	1.21
6	1 22 30.40	0.184	6 52 46.9	1.23	6 4 17.2	1 22 31.18	0.184	6 52 52.2	1.23
7	1 22 34.85	0.188	6 53 16.7	1.26	7 4 13.3	1 22 35.65	0.189	6 53 22.0	1.26
8	1 22 39.42	0.193	6 53 47.2	1.28	8 4 9.5	1 22 40.23	0.193	6 53 52.5	1.28
9	1 22 44.10	0.198	6 54 18.3	1.31	9 4 5.6	1 22 44.92	0.198	6 54 23.7	1.31
10	1 22 48.89	0.202	6 54 50.0	1.33	10 4 1.8	1 22 49.71	0.202	6 54 55.4	1.33
11	1 22 53.79	0.207	6 55 22.3	1.36	11 3 57.9	1 22 54.61	0.207	6 55 27.7	1.36
12	1 22 58.80	0.211	6 55 55.2	1.38	12 3 54.1	1 22 59.62	0.211	6 56 0.6	1.38
13	1 23 3.91	0.215	6 56 28.7	1.41	13 3 50.2	1 23 4.73	0.215	6 56 34.1	1.41
14	1 23 9.12	0.220	6 57 2.8	1.43	14 3 46.4	1 23 9.94	0.220	6 57 8.2	1.43
15	1 23 14.44	0.224	6 57 37.5	1.46	15 3 42.5	1 23 15.26	0.224	6 57 42.9	1.46
16	1 23 19.86	0.228	6 58 12.7	1.48	16 3 38.7	1 23 20.68	0.228	6 58 18.1	1.48
17	1 23 25.38	0.232	6 58 48.5	1.50	17 3 34.9	1 23 26.21	0.232	6 58 53.9	1.50
18	1 23 31.00	0.236	6 59 24.8	1.53	18 3 31.0	1 23 31.83	0.236	6 59 30.2	1.52
19	1 23 36.72	0.240	7 0 1.6	1.55	19 3 27.2	1 23 37.55	0.240	7 0 7.0	1.55
20	1 23 42.53	0.244	7 0 39.0	1.57	20 3 23.4	1 23 43.36	0.244	7 0 44.3	1.57
21	1 23 48.44	0.248	7 1 16.9	1.59	21 3 19.5	1 23 49.26	0.248	7 1 22.1	1.59
22	1 23 54.44	0.252	7 1 55.3	1.61	22 3 15.7	1 23 55.26	0.252	7 2 0.5	1.61
23	1 24 0.53	0.256	7 2 34.2	1.63	23 3 11.9	1 24 1.35	0.256	7 2 39.4	1.63
24	1 24 6.71	0.260	7 3 13.6	1.65	24 3 8.0	1 24 7.53	0.260	7 3 18.7	1.65
25	1 24 12.98	0.264	7 3 53.4	1.67	25 3 4.2	1 24 13.79	0.264	7 3 58.5	1.67
26	1 24 19.34	0.267	7 4 33.7	1.69	26 3 0.4	1 24 20.14	0.267	7 4 38.8	1.69
27	1 24 25.78	0.270	7 5 14.5	1.71	27 2 56.6	1 24 26.58	0.270	7 5 19.5	1.71
28	1 24 32.30	0.274	7 5 55.7	1.73	28 2 52.7	1 24 33.10	0.274	7 6 0.7	1.73
29	1 24 38.91	0.277	7 6 37.3	1.75	29 2 48.9	1 24 39.70	0.277	7 6 42.3	1.74
30	1 24 45.60	+0.281	+ 7 7 19.4	+ 1.76	30 2 45.1	1 24 46.38	+0.281	+ 7 7 24.3	+ 1.76

Date. 1872.	FOR WASHINGTON MEAN NOON.					FOR MERIDIAN TRANSIT.				
	Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.		Mean Time of Transit.	Apparent Right Ascension.	Diff. for 1 h. of Long.	Apparent Declination.	Diff. for 1 hour of Long.
Mar. 1	<sup>h</sup> 1 <sup>m</sup> 24 <sup>s</sup> 45.60	+0.281	<sup>°</sup> 7 <sup>'</sup> 19.4	+ 1.76		<sup>d</sup> 1 <sup>h</sup> 2 <sup>m</sup> 45.1	<sup>h</sup> 1 <sup>m</sup> 24 <sup>s</sup> 46.38	+0.281	<sup>°</sup> 7 <sup>'</sup> 24.3	+ 1.76
2	1 24 52.37	0.284	7 8 1.9	1.78		2 2 41.3	1 24 53.14	0.284	7 8 6.7	1.78
3	1 24 59.22	0.287	7 8 44.7	1.80		3 2 37.4	1 24 59.98	0.287	7 8 49.4	1.80
4	1 25 6.14	0.290	7 9 28.0	1.81		4 2 33.6	1 25 6.89	0.290	7 9 32.6	1.81
5	1 25 13.14	0.293	7 10 11.7	1.83		5 2 29.8	1 25 13.87	0.293	7 10 16.3	1.83
6	1 25 20.21	0.296	7 10 55.8	1.85		6 2 26.0	1 25 20.93	0.296	7 11 0.3	1.84
7	1 25 27.36	0.299	7 11 40.2	1.86		7 2 22.2	1 25 28.06	0.299	7 11 44.6	1.86
8	1 25 34.57	0.302	7 12 25.0	1.87		8 2 18.4	1 25 35.26	0.302	7 12 29.3	1.87
9	1 25 41.85	0.305	7 13 10.1	1.89		9 2 14.6	1 25 42.53	0.305	7 13 14.3	1.88
10	1 25 49.23	0.308	7 13 55.5	1.90		10 2 10.8	1 25 49.87	0.308	7 13 59.6	1.90
11	1 25 56.62	0.310	7 14 41.2	1.91		11 2 6.9	1 25 57.27	0.310	7 14 45.3	1.91
12	1 26 4.09	0.313	7 15 27.3	1.93		12 2 3.1	1 26 4.73	0.313	7 15 31.3	1.93
13	1 26 11.62	0.316	7 16 13.7	1.94		13 1 59.3	1 26 12.25	0.316	7 16 17.6	1.94
14	1 26 19.22	0.318	7 17 0.4	1.95		14 1 55.5	1 26 19.83	0.318	7 17 1.1	1.95
15	1 26 26.87	0.320	7 17 47.3	1.96		15 1 51.7	1 26 27.46	0.320	7 17 50.9	1.96
16	1 26 34.57	0.322	7 18 34.4	1.97		16 1 47.9	1 26 35.15	0.322	7 18 37.9	1.97
17	1 26 42.33	0.324	7 19 21.8	1.98		17 1 44.1	1 26 42.89	0.324	7 19 25.2	1.98
18	1 26 50.14	0.327	7 20 9.5	1.99		18 1 40.3	1 26 50.69	0.327	7 20 12.8	1.99
19	1 26 58.01	0.329	7 20 57.4	2.00		19 1 36.5	1 26 58.54	0.329	7 21 0.6	2.00
20	1 27 5.92	0.331	7 21 45.4	2.01		20 1 32.7	1 27 6.43	0.331	7 21 48.5	2.01
21	1 27 13.87	0.333	7 22 33.7	2.02		21 1 28.9	1 27 14.36	0.333	7 22 36.7	2.02
22	1 27 21.86	0.334	7 23 22.2	2.03		22 1 25.1	1 27 22.33	0.334	7 23 25.1	2.02
23	1 27 29.90	0.336	7 24 10.9	2.03		23 1 21.3	1 27 30.35	0.336	7 24 13.7	2.03
24	1 27 37.98	0.338	7 24 59.7	2.04		24 1 17.5	1 27 38.42	0.338	7 25 2.4	2.04
25	1 27 46.10	0.339	7 25 48.7	2.05		25 1 13.7	1 27 46.52	0.339	7 25 51.2	2.04
26	1 27 54.26	0.341	7 26 37.8	2.05		26 1 9.9	1 27 54.66	0.341	7 26 40.2	2.05
27	1 28 2.45	0.342	7 27 27.1	2.06		27 1 6.1	1 28 2.83	0.342	7 27 29.3	2.05
28	1 28 10.67	0.344	7 28 16.5	2.06		28 1 2.3	1 28 11.03	0.344	7 28 18.5	2.06
29	1 28 18.93	0.345	7 29 5.9	2.06		29 0 58.5	1 28 19.26	0.345	7 29 7.9	2.06
30	1 28 27.22	0.346	7 29 55.5	2.07		30 0 54.7	1 28 27.53	0.346	7 29 57.4	2.07
31	1 28 35.54	0.347	7 30 45.2	2.07		31 0 50.9	1 28 35.83	0.347	7 30 47.0	2.07
Apr. 1	1 28 43.88	0.348	7 31 35.0	2.08		1 0 47.1	1 28 44.15	0.348	7 31 36.7	2.07
2	1 28 52.25	0.349	7 32 24.9	2.08		2 0 43.4	1 28 52.50	0.349	7 32 26.4	2.08
3	1 29 0.63	0.350	7 33 14.8	2.08		3 0 39.6	1 29 0.86	0.350	7 33 16.2	2.08
4	1 29 9.03	0.351	7 34 4.7	2.08		4 0 35.8	1 29 9.24	0.351	7 34 6.0	2.08
5	1 29 17.46	0.352	7 34 54.7	2.08		5 0 32.0	1 29 17.65	0.352	7 34 55.8	2.08
6	1 29 25.91	0.352	7 35 44.8	2.09		6 0 28.2	1 29 26.08	0.352	7 35 45.7	2.08
7	1 29 34.37	0.353	7 36 34.9	2.09		7 0 24.4	1 29 34.51	0.353	7 36 35.7	2.08
8	1 29 42.84	0.354	7 37 24.9	2.08		8 0 20.6	1 29 42.96	0.354	7 37 25.6	2.08
9	1 29 51.33	0.354	7 38 14.9	2.08		9 0 16.8	1 29 51.43	0.354	7 38 15.5	2.08
10	1 29 59.82	0.354	7 39 5.0	2.08		10 0 13.0	1 29 59.90	0.354	7 39 5.4	2.08
11	1 30 8.32	0.355	7 39 55.0	2.08		11 0 9.2	1 30 8.37	0.355	7 39 55.3	2.08
12	1 30 16.82	0.355	7 40 44.9	2.08		12 0 5.4	1 30 16.85	0.355	7 40 45.1	2.08
13	1 30 25.33	0.355	7 41 34.7	2.08		13 0 1.7	1 30 25.34	0.355	7 41 34.8	2.07
						13 23 57.9	1 30 33.83	0.355	7 42 24.5	2.07
14	1 30 33.84	0.355	7 42 24.6	2.08		14 23 54.1	1 30 42.31	0.355	7 43 14.2	2.07
15	1 30 42.35	0.355	7 43 14.4	2.07		15 23 50.3	1 30 50.80	0.355	7 44 3.7	2.06
16	1 30 50.86	0.355	7 44 4.0	2.07		16 23 46.5	1 30 59.28	0.354	7 44 53.0	2.06
17	1 30 59.36	0.354	7 44 53.5	2.06		17 23 42.7	1 31 7.76	0.354	7 45 42.3	2.05
18	1 31 7.86	0.354	7 45 42.9	2.06		18 23 38.9	1 31 16.23	0.354	7 46 31.5	2.05
19	1 31 16.35	0.354	7 46 32.2	2.05		19 23 35.1	1 31 24.68	0.353	7 47 20.5	2.04
20	1 31 24.82	0.353	7 47 21.4	2.05		20 23 31.3	1 31 33.12	0.353	7 48 9.4	2.04
21	1 31 33.29	0.353	7 48 10.4	2.04		21 23 27.5	1 31 41.55	0.352	7 48 58.2	2.03
22	1 31 41.74	0.352	7 48 59.3	2.03		22 23 23.7	1 31 49.97	0.352	7 49 46.8	2.02
23	1 31 50.18	0.352	7 49 48.0	2.03		23 23 20.0	1 31 58.37	0.351	7 50 35.2	2.02
24	1 31 58.60	0.351	7 50 36.5	2.02		24 23 16.2	1 32 6.74	0.350	7 51 23.4	2.01
25	1 32 7.00	0.350	7 51 24.9	2.01		25 23 12.4	1 32 15.10	0.349	7 52 11.5	2.00
26	1 32 15.38	0.349	7 52 13.1	2.01		26 23 8.6	1 32 23.44	0.348	7 52 59.4	1.99
27	1 32 23.74	0.348	7 53 1.1	2.00		27 23 4.8	1 32 31.76	0.347	7 53 47.0	1.98
28	1 32 32.08	0.347	7 53 48.9	1.99		28 23 1.0	1 32 40.05	0.346	7 54 34.4	1.97
29	1 32 40.39	0.346	7 54 36.4	1.98		29 23 59.2	1 32 48.31	0.345	7 55 21.6	1.96
30	1 32 48.67	+0.345	7 55 23.7	+ 1.97		30 23 53.4	1 32 56.55	+0.344	7 56 8.6	+ 1.95

Date. 1872.	FOR WASHINGTON MEAN NOON.				FOR MERIDIAN TRANSIT.				
	Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Mean Time of Transit.	Apparent Right Ascension.	Diff. for 1 h. of Long.	Apparent Declination.	Diff. for 1 hour of Long.
May 1	h m s 1 32 56.93	+0.344	+ 7 56 10.8	+ 1.96	d h m 1 22 49.6	h m s 1 33 4.76	+0.342	+ 7 56 55.3	+ 1.94
2	1 33 5.16	0.342	7 56 57.6	1.95	2 22 45.8	1 33 12.93	0.341	7 57 41.7	1.93
3	1 33 13.35	0.341	7 57 44.1	1.94	3 22 42.0	1 33 21.07	0.339	7 58 27.9	1.92
4	1 33 21.51	0.339	7 58 30.4	1.93	4 22 38.2	1 33 29.17	0.338	7 59 13.9	1.91
5	1 33 29.63	0.338	7 59 16.5	1.91	5 22 34.4	1 33 37.23	0.336	7 59 59.5	1.89
6	1 33 37.71	0.336	8 0 2.2	1.90	6 22 30.6	1 33 45.25	0.334	8 0 44.7	1.88
7	1 33 45.75	0.334	8 0 47.6	1.89	7 22 26.8	1 33 53.23	0.333	8 1 29.7	1.87
8	1 33 53.75	0.333	8 1 32.7	1.87	8 22 23.0	1 34 1.17	0.331	8 2 14.4	1.86
9	1 34 1.71	0.331	8 2 17.5	1.86	9 22 19.2	1 34 9.07	0.329	8 2 58.7	1.84
10	1 34 9.63	0.329	8 3 1.9	1.85	10 22 15.4	1 34 16.92	0.327	8 3 42.7	1.83
11	1 34 17.49	0.327	8 3 46.0	1.83	11 22 11.6	1 34 24.72	0.325	8 4 26.3	1.81
12	1 34 25.31	0.325	8 4 29.7	1.82	12 22 7.8	1 34 32.47	0.323	8 5 9.6	1.80
13	1 34 33.08	0.323	8 5 13.1	1.80	13 22 4.0	1 34 40.17	0.321	8 5 52.5	1.78
14	1 34 40.79	0.321	8 5 56.1	1.78	14 22 0.2	1 34 47.81	0.318	8 6 35.0	1.76
15	1 34 48.45	0.318	8 6 38.7	1.77	15 21 56.4	1 34 55.40	0.316	8 7 17.2	1.75
16	1 34 56.05	0.316	8 7 20.9	1.75	16 21 52.6	1 35 2.93	0.314	8 7 59.0	1.73
17	1 35 3.60	0.314	8 8 2.8	1.74	17 21 48.8	1 35 10.40	0.311	8 8 40.4	1.72
18	1 35 11.08	0.311	8 8 44.3	1.72	18 21 45.0	1 35 17.81	0.308	8 9 21.4	1.70
19	1 35 18.51	0.309	8 9 25.3	1.70	19 21 41.2	1 35 25.17	0.306	8 10 1.9	1.68
20	1 35 25.88	0.306	8 10 5.9	1.68	20 21 37.4	1 35 32.46	0.303	8 10 42.0	1.66
21	1 35 33.18	0.303	8 10 46.1	1.67	21 21 33.6	1 35 39.69	0.300	8 11 21.7	1.65
22	1 35 40.42	0.300	8 11 25.9	1.65	22 21 29.8	1 35 46.85	0.297	8 12 1.0	1.63
23	1 35 47.59	0.298	8 12 5.2	1.63	23 21 25.9	1 35 53.94	0.294	8 12 39.8	1.61
24	1 35 54.69	0.294	8 12 44.0	1.61	24 21 22.1	1 36 0.96	0.291	8 13 18.1	1.59
25	1 36 1.73	0.292	8 13 22.4	1.59	25 21 18.3	1 36 7.91	0.289	8 13 56.0	1.57
26	1 36 8.70	0.289	8 14 0.4	1.57	26 21 14.5	1 36 14.80	0.286	8 14 33.5	1.55
27	1 36 15.59	0.286	8 14 37.9	1.55	27 21 10.7	1 36 21.61	0.283	8 15 10.4	1.53
28	1 36 22.41	0.283	8 15 14.8	1.53	28 21 6.8	1 36 28.35	0.280	8 15 46.8	1.51
29	1 36 29.16	0.280	8 15 51.3	1.51	29 21 3.0	1 36 35.02	0.276	8 16 22.8	1.49
30	1 36 35.83	0.276	8 16 27.3	1.49	30 20 59.2	1 36 41.60	0.273	8 16 58.3	1.47
31	1 36 42.42	0.273	8 17 2.8	1.47	31 20 55.4	1 36 48.10	0.270	8 17 33.2	1.45
June 1	1 36 48.93	0.270	8 17 37.7	1.45	1 20 51.6	1 36 54.52	0.266	8 18 7.6	1.43
2	1 36 55.36	0.266	8 18 12.2	1.43	2 20 47.7	1 37 0.87	0.263	8 18 41.6	1.41
3	1 37 1.71	0.263	8 18 46.2	1.41	3 20 43.9	1 37 7.13	0.259	8 19 15.0	1.38
4	1 37 7.98	0.259	8 19 19.6	1.38	4 20 40.1	1 37 13.30	0.256	8 19 47.9	1.36
5	1 37 14.16	0.256	8 19 52.5	1.36	5 20 36.2	1 37 19.39	0.253	8 20 20.2	1.33
6	1 37 20.25	0.253	8 20 24.8	1.33	6 20 32.4	1 37 25.39	0.249	8 20 51.9	1.31
7	1 37 26.25	0.249	8 20 56.5	1.31	7 20 28.6	1 37 31.30	0.245	8 21 23.0	1.29
8	1 37 32.17	0.245	8 21 27.6	1.29	8 20 24.7	1 37 37.12	0.241	8 21 53.6	1.26
9	1 37 37.99	0.241	8 21 58.2	1.26	9 20 20.9	1 37 42.84	0.237	8 22 23.6	1.24
10	1 37 43.71	0.237	8 22 28.2	1.24	10 20 17.1	1 37 48.48	0.233	8 22 53.1	1.22
11	1 37 49.35	0.233	8 22 57.6	1.22	11 20 13.2	1 37 54.03	0.230	8 23 22.0	1.19
12	1 37 54.91	0.229	8 23 26.5	1.19	12 20 9.4	1 37 59.49	0.226	8 23 50.2	1.16
13	1 38 0.36	0.225	8 23 54.8	1.16	13 20 5.5	1 38 4.84	0.222	8 24 17.9	1.14
14	1 38 5.71	0.221	8 24 22.4	1.14	14 20 1.7	1 38 10.09	0.218	8 24 45.0	1.12
15	1 38 10.96	0.217	8 24 49.4	1.12	15 19 57.9	1 38 15.24	0.213	8 25 11.4	1.09
16	1 38 16.11	0.213	8 25 15.9	1.09	16 19 54.0	1 38 20.30	0.209	8 25 37.3	1.07
17	1 38 21.16	0.209	8 25 41.7	1.06	17 19 50.2	1 38 25.26	0.205	8 26 2.6	1.04
18	1 38 26.11	0.204	8 26 6.9	1.04	18 19 46.3	1 38 30.12	0.200	8 26 27.2	1.01
19	1 38 30.96	0.200	8 26 31.4	1.01	19 19 42.5	1 38 34.87	0.196	8 26 51.2	0.99
20	1 38 35.71	0.196	8 26 55.4	0.99	20 19 38.6	1 38 39.52	0.192	8 27 14.5	0.96
21	1 38 40.35	0.191	8 27 18.7	0.96	21 19 34.7	1 38 44.06	0.187	8 27 37.2	0.93
22	1 38 44.89	0.187	8 27 41.3	0.93	22 19 30.9	1 38 48.50	0.183	8 27 59.2	0.91
23	1 38 49.32	0.183	8 28 3.3	0.90	23 19 27.0	1 38 52.84	0.179	8 28 20.7	0.88
24	1 38 53.65	0.178	8 28 24.7	0.88	24 19 23.2	1 38 57.07	0.174	8 28 41.6	0.86
25	1 38 57.87	0.174	8 28 45.5	0.85	25 19 19.3	1 39 1.19	0.170	8 29 1.8	0.83
26	1 39 1.98	0.169	8 29 5.6	0.82	26 19 15.4	1 39 5.21	0.165	8 29 21.2	0.80
27	1 39 5.99	0.165	8 29 24.9	0.79	27 19 11.6	1 39 9.11	0.161	8 29 39.9	0.77
28	1 39 9.88	0.160	8 29 43.6	0.77	28 19 7.7	1 39 12.90	0.156	8 29 58.1	0.74
29	1 39 13.66	0.156	8 30 1.7	0.74	29 19 3.8	1 39 16.58	0.152	8 30 15.6	0.72
30	1 39 17.33	0.151	8 30 19.2	0.71	30 19 0.0	1 39 20.15	0.147	8 30 32.5	0.69
31	1 39 20.88	+0.146	+ 8 30 35.9	+ 0.68	31 18 56.1	1 39 23.60	+0.142	+ 8 30 48.6	+ 0.66

Date. 1872.	FOR WASHINGTON MEAN NOON.				FOR MERIDIAN TRANSIT.				
	Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Mean Time of Transit.	Apparent Right Ascension.	Diff. for 1 h. of Long.	Apparent Declination.	Diff. for 1 hour of Long.
July 1	<sup>h</sup> 1 <sup>m</sup> 39 <sup>s</sup> 23.88	+0.146	+ 8 30' 35.9"	+ 0.68	<sup>d</sup> 1 <sup>h</sup> 18 <sup>m</sup> 56.1	<sup>h</sup> 1 <sup>m</sup> 39 <sup>s</sup> 23.69	+0.142	+ 8 30' 48.6"	+ 0.66
2	1 39 24.32	0.141	8 30 51.9	0.65	2 18 52.2	1 39 26.93	0.137	8 31 4.0	0.63
3	1 39 27.64	0.136	8 31 7.2	0.63	3 18 48.3	1 39 30.15	0.132	8 31 18.8	0.60
4	1 39 30.84	0.131	8 31 21.9	0.60	4 18 44.4	1 39 33.26	0.128	8 31 32.9	0.57
5	1 39 33.93	0.127	8 31 36.0	0.57	5 18 40.5	1 39 36.25	0.123	8 31 46.3	0.54
6	1 39 36.91	0.122	8 31 49.3	0.54	6 18 36.7	1 39 39.12	0.118	8 31 59.0	0.51
7	1 39 39.76	0.117	8 32 1.9	0.51	7 18 32.8	1 39 41.88	0.113	8 32 11.0	0.48
8	1 39 42.50	0.112	8 32 13.7	0.48	8 18 28.9	1 39 44.52	0.107	8 32 22.3	0.46
9	1 39 45.11	0.106	8 32 24.9	0.45	9 18 25.0	1 39 47.03	0.102	8 32 33.0	0.43
10	1 39 47.63	0.101	8 32 35.4	0.42	10 18 21.1	1 39 49.42	0.097	8 32 43.0	0.40
11	1 39 49.98	0.096	8 32 45.3	0.39	11 18 17.2	1 39 51.70	0.092	8 32 52.3	0.37
12	1 39 52.23	0.091	8 32 54.4	0.36	12 18 13.3	1 39 53.86	0.087	8 33 0.8	0.34
13	1 39 54.36	0.086	8 33 2.7	0.33	13 18 9.4	1 39 55.89	0.082	8 33 8.5	0.31
14	1 39 56.37	0.081	8 33 10.3	0.30	14 18 5.5	1 39 57.83	0.077	8 33 15.6	0.28
15	1 39 58.26	0.076	8 33 17.2	0.27	15 18 1.6	1 39 59.63	0.072	8 33 22.0	0.25
16	1 40 0.03	0.071	8 33 23.4	0.25	16 17 57.7	1 40 1.27	0.067	8 33 27.6	0.22
17	1 40 1.67	0.066	8 33 29.0	0.22	17 17 53.8	1 40 2.82	0.062	8 33 32.6	0.19
18	1 40 3.23	0.061	8 33 33.8	0.19	18 17 49.9	1 40 4.25	0.057	8 33 36.9	0.16
19	1 40 4.63	0.056	8 33 37.9	0.16	19 17 46.0	1 40 5.56	0.052	8 33 40.5	0.14
20	1 40 5.88	0.051	8 33 41.3	0.13	20 17 42.1	1 40 6.74	0.047	8 33 43.4	0.10
21	1 40 7.04	0.046	8 33 44.0	0.10	21 17 38.2	1 40 7.81	0.041	8 33 45.5	0.07
22	1 40 8.07	0.040	8 33 46.0	0.07	22 17 34.2	1 40 8.75	0.036	8 33 46.9	0.05
23	1 40 8.98	0.035	8 33 47.3	0.04	23 17 30.3	1 40 9.56	0.031	8 33 47.7	+ 0.02
24	1 40 9.76	0.030	8 33 47.9	+ 0.01	24 17 26.4	1 40 10.25	0.026	8 33 47.8	- 0.01
25	1 40 10.42	0.025	8 33 47.8	- 0.02	25 17 22.5	1 40 10.82	0.021	8 33 47.2	0.04
26	1 40 10.96	0.020	8 33 46.9	0.05	26 17 18.6	1 40 11.26	0.016	8 33 45.8	0.07
27	1 40 11.37	0.015	8 33 45.3	0.08	27 17 14.7	1 40 11.59	0.011	8 33 43.7	0.10
28	1 40 11.66	0.009	8 33 43.1	0.11	28 17 10.7	1 40 11.79	0.006	8 33 41.0	0.13
29	1 40 11.82	+0.004	8 33 40.1	0.14	29 17 6.8	1 40 11.86	+0.001	8 33 37.6	0.16
30	1 40 11.86	-0.001	8 33 36.4	0.17	30 17 2.8	1 40 11.81	-0.004	8 33 33.5	0.19
31	1 40 11.78	0.006	8 33 32.0	0.20	31 16 58.9	1 40 11.64	0.009	8 33 28.6	0.22
Aug. 1	1 40 11.57	0.011	8 33 27.0	0.22	1 16 55.0	1 40 11.35	0.015	8 33 23.0	0.25
2	1 40 11.24	0.017	8 33 21.3	0.25	2 16 51.0	1 40 10.93	0.020	8 33 16.7	0.28
3	1 40 10.78	0.022	8 33 14.8	0.28	3 16 47.1	1 40 10.39	0.025	8 33 9.8	0.30
4	1 40 10.23	0.027	8 33 7.6	0.31	4 16 43.1	1 40 9.73	0.030	8 33 2.2	0.33
5	1 40 9.50	0.032	8 32 59.7	0.34	5 16 39.2	1 40 8.94	0.035	8 32 53.9	0.36
6	1 40 8.68	0.037	8 32 51.1	0.37	6 16 35.3	1 40 8.03	0.040	8 32 44.8	0.39
7	1 40 7.73	0.042	8 32 41.9	0.40	7 16 31.3	1 40 7.00	0.045	8 32 35.1	0.42
8	1 40 6.66	0.047	8 32 32.0	0.43	8 16 27.3	1 40 5.86	0.050	8 32 24.8	0.45
9	1 40 5.47	0.052	8 32 21.4	0.46	9 16 23.4	1 40 4.59	0.055	8 32 13.8	0.47
10	1 40 4.16	0.057	8 32 10.1	0.48	10 16 19.4	1 40 3.20	0.060	8 32 2.1	0.50
11	1 40 2.73	0.062	8 31 58.2	0.51	11 16 15.5	1 40 1.69	0.065	8 31 49.7	0.53
12	1 40 1.18	0.067	8 31 45.6	0.54	12 16 11.5	1 40 0.06	0.070	8 31 36.7	0.56
13	1 39 59.51	0.072	8 31 32.3	0.57	13 16 7.6	1 39 58.32	0.075	8 31 23.0	0.59
14	1 39 57.72	0.077	8 31 18.4	0.59	14 16 3.6	1 39 56.46	0.080	8 31 8.7	0.61
15	1 39 55.82	0.082	8 31 3.8	0.62	15 15 59.6	1 39 54.48	0.085	8 30 53.8	0.64
16	1 39 53.83	0.087	8 30 48.6	0.65	16 15 55.7	1 39 52.39	0.090	8 30 38.2	0.66
17	1 39 51.66	0.092	8 30 32.8	0.67	17 15 51.7	1 39 50.18	0.094	8 30 22.0	0.69
18	1 39 49.41	0.096	8 30 16.3	0.70	18 15 47.7	1 39 47.87	0.099	8 30 5.2	0.72
19	1 39 47.05	0.101	8 29 59.2	0.73	19 15 43.8	1 39 45.45	0.104	8 29 47.7	0.74
20	1 39 44.58	0.106	8 29 41.5	0.75	20 15 39.8	1 39 42.91	0.108	8 29 29.6	0.77
21	1 39 41.99	0.110	8 29 23.1	0.78	21 15 35.8	1 39 40.25	0.113	8 29 10.9	0.79
22	1 39 39.29	0.115	8 29 4.2	0.80	22 15 31.8	1 39 37.48	0.117	8 28 51.7	0.81
23	1 39 36.48	0.119	8 28 44.7	0.83	23 15 27.9	1 39 34.61	0.122	8 28 31.9	0.84
24	1 39 33.56	0.124	8 28 24.6	0.85	24 15 23.9	1 39 31.63	0.127	8 28 11.5	0.86
25	1 39 30.53	0.129	8 28 3.8	0.88	25 15 19.9	1 39 28.54	0.131	8 27 50.4	0.89
26	1 39 27.40	0.133	8 27 42.5	0.90	26 15 15.9	1 39 25.35	0.135	8 27 28.7	0.92
27	1 39 24.16	0.137	8 27 20.6	0.93	27 15 11.9	1 39 22.05	0.140	8 27 6.5	0.94
28	1 39 20.81	0.142	8 26 58.1	0.95	28 15 7.9	1 39 18.65	0.144	8 26 43.8	0.96
29	1 39 17.36	0.146	8 26 35.1	0.97	29 15 3.9	1 39 15.14	0.148	8 26 23.5	0.98
30	1 39 13.81	0.150	8 26 11.6	0.99	30 14 59.9	1 39 11.53	0.152	8 25 56.6	1.01
31	1 39 10.16	-0.154	+ 8 25 47.5	- 1.02	31 14 55.9	1 39 7.83	-0.156	+ 8 25 32.2	- 1.03



Date. 1872.	FOR WASHINGTON MEAN NOON.				FOR MERIDIAN TRANSIT.				
	Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Mean Time of Transit.	Apparent Right Ascension.	Diff. for 1 h. of Long.	Apparent Declination.	Diff. for 1 hour of Long.
Sept. 1	h m s		° ' "		d h m	h m s		° ' "	
2	1 39 6.40	-0.158	+ 8 25 22.8	- 1.04	1 14 52.0	1 39 4.03	-0.161	+ 8 25 7.3	- 1.05
3	1 39 2.55	0.163	8 24 57.5	1.06	2 14 48.0	1 39 0.13	0.165	8 24 41.8	1.07
4	1 38 58.60	0.167	8 24 31.8	1.08	3 14 43.9	1 38 56.13	0.169	8 24 15.8	1.09
5	1 38 54.55	0.171	8 24 5.6	1.10	4 14 39.9	1 38 52.03	0.173	8 23 49.3	1.11
6	1 38 50.41	0.175	8 23 38.9	1.12	5 14 35.9	1 38 47.84	0.177	8 23 22.4	1.13
7	1 38 46.17	0.179	8 23 11.7	1.14	6 14 31.9	1 38 43.56	0.180	8 22 55.0	1.15
8	1 38 41.84	0.182	8 22 44.0	1.16	7 14 27.9	1 38 39.19	0.184	8 22 27.1	1.17
9	1 38 37.43	0.186	8 22 15.8	1.18	8 14 23.9	1 38 34.74	0.188	8 21 58.8	1.19
10	1 38 32.93	0.190	8 21 47.2	1.20	9 14 19.9	1 38 30.20	0.191	8 21 30.0	1.21
11	1 38 28.34	0.193	8 21 18.2	1.22	10 14 15.9	1 38 25.57	0.195	8 21 0.8	1.23
12	1 38 23.66	0.197	8 20 48.7	1.24	11 14 11.9	1 38 20.86	0.198	8 20 31.1	1.25
13	1 38 18.91	0.200	8 20 18.8	1.26	12 14 7.9	1 38 16.07	0.201	8 20 1.0	1.26
14	1 38 14.08	0.203	8 19 48.5	1.27	13 14 3.9	1 38 11.21	0.204	8 19 30.6	1.28
15	1 38 9.17	0.206	8 19 17.7	1.29	14 13 59.8	1 38 6.27	0.207	8 18 59.7	1.30
16	1 38 4.18	0.210	8 18 46.6	1.31	15 13 55.8	1 38 1.26	0.211	8 18 28.4	1.31
17	1 37 59.12	0.213	8 18 15.1	1.32	16 13 51.8	1 37 56.17	0.214	8 17 56.8	1.32
18	1 37 53.99	0.216	8 17 43.2	1.33	17 13 47.8	1 37 51.03	0.217	8 17 24.8	1.34
19	1 37 48.78	0.219	8 17 11.0	1.35	18 13 43.8	1 37 45.77	0.220	8 16 52.5	1.35
20	1 37 43.50	0.222	8 16 38.5	1.36	19 13 39.8	1 37 40.47	0.223	8 16 19.8	1.37
21	1 37 38.16	0.224	8 16 5.6	1.38	20 13 35.7	1 37 35.10	0.225	8 15 46.8	1.38
22	1 37 32.75	0.227	8 15 32.3	1.39	21 13 31.7	1 37 29.67	0.228	8 15 13.5	1.39
23	1 37 27.28	0.229	8 14 58.8	1.41	22 13 27.7	1 37 24.18	0.230	8 14 40.0	1.41
24	1 37 21.75	0.232	8 14 25.0	1.42	23 13 23.7	1 37 18.63	0.233	8 14 6.1	1.42
25	1 37 16.16	0.234	8 13 50.9	1.43	24 13 19.6	1 37 13.03	0.235	8 13 31.9	1.43
26	1 37 10.51	0.237	8 13 16.5	1.44	25 13 15.6	1 37 7.37	0.238	8 12 57.4	1.44
27	1 37 4.89	0.239	8 12 41.8	1.45	26 13 11.6	1 37 1.65	0.240	8 12 22.7	1.45
28	1 36 59.04	0.241	8 12 6.9	1.46	27 13 7.5	1 36 55.87	0.242	8 11 47.8	1.46
29	1 36 53.23	0.243	8 11 31.8	1.47	28 13 3.5	1 36 50.05	0.244	8 11 12.6	1.47
30	1 36 47.37	0.245	8 10 56.4	1.48	29 12 59.5	1 36 44.19	0.246	8 10 37.2	1.48
31	1 36 41.47	0.247	8 10 20.8	1.49	30 12 55.5	1 36 38.28	0.248	8 10 1.6	1.49
Oct. 1	1 36 35.52	0.249	8 9 45.0	1.50	1 12 51.4	1 36 32.32	0.250	8 9 25.8	1.50
2	1 36 29.53	0.251	8 9 9.0	1.51	2 12 47.4	1 36 26.32	0.251	8 8 49.8	1.51
3	1 36 23.50	0.252	8 8 32.9	1.51	3 12 43.4	1 36 20.29	0.253	8 8 13.8	1.51
4	1 36 17.44	0.254	8 7 56.7	1.51	4 12 39.3	1 36 14.23	0.254	8 7 37.6	1.52
5	1 36 11.34	0.255	8 7 20.3	1.52	5 12 35.3	1 36 8.13	0.255	8 7 1.2	1.52
6	1 36 5.21	0.256	8 6 43.7	1.53	6 12 31.3	1 36 2.00	0.256	8 6 24.6	1.53
7	1 35 59.05	0.257	8 6 7.0	1.53	7 12 27.2	1 35 55.84	0.257	8 5 47.9	1.53
8	1 35 52.86	0.258	8 5 30.2	1.53	8 12 23.2	1 35 49.66	0.258	8 5 11.2	1.53
9	1 35 46.65	0.259	8 4 53.4	1.54	9 12 19.2	1 35 43.46	0.259	8 4 34.4	1.54
10	1 35 40.42	0.260	8 4 16.5	1.54	10 12 15.1	1 35 37.23	0.260	8 3 57.6	1.54
11	1 35 34.17	0.261	8 3 39.6	1.54	11 12 11.1	1 35 30.99	0.261	8 3 20.8	1.54
12	1 35 27.90	0.262	8 3 2.6	1.54	12 12 7.1	1 35 24.73	0.262	8 2 43.9	1.54
13	1 35 21.62	0.262	8 2 25.6	1.54	13 12 3.0	1 35 18.46	0.262	8 2 7.0	1.54
14	1 35 15.33	0.263	8 1 48.7	1.54	14 11 59.0	1 35 12.18	0.263	8 1 30.2	1.54
15	1 35 9.03	0.263	8 1 11.7	1.54	15 11 55.0	1 35 5.90	0.263	8 0 53.4	1.54
16	1 35 2.72	0.263	8 0 34.7	1.54	16 11 50.9	1 34 59.69	0.263	8 0 16.5	1.54
17	1 34 56.40	0.264	7 59 57.8	1.54	17 11 46.9	1 34 53.29	0.263	7 59 39.7	1.54
18	1 34 50.08	0.264	7 59 20.9	1.54	18 11 42.8	1 34 46.99	0.263	7 59 2.9	1.53
19	1 34 43.76	0.263	7 58 44.1	1.53	19 11 38.8	1 34 40.70	0.263	7 58 26.2	1.53
20	1 34 37.45	0.263	7 58 7.5	1.53	20 11 34.7	1 34 34.41	0.263	7 57 49.7	1.52
21	1 34 31.14	0.263	7 57 30.9	1.53	21 11 30.7	1 34 28.12	0.263	7 57 13.3	1.52
22	1 34 24.84	0.262	7 56 54.3	1.52	22 11 26.7	1 34 21.84	0.262	7 56 36.9	1.51
23	1 34 18.55	0.262	7 56 17.8	1.52	23 11 22.6	1 34 15.58	0.261	7 56 0.6	1.51
24	1 34 12.27	0.261	7 55 41.5	1.51	24 11 18.6	1 34 9.32	0.261	7 55 24.5	1.50
25	1 34 6.01	0.261	7 55 5.4	1.50	25 11 14.6	1 34 3.08	0.261	7 54 48.6	1.49
26	1 33 59.76	0.260	7 54 29.5	1.49	26 11 10.5	1 33 56.86	0.260	7 54 12.9	1.48
27	1 33 53.53	0.259	7 53 53.8	1.49	27 11 6.5	1 33 50.66	0.259	7 53 37.4	1.48
28	1 33 47.33	0.258	7 53 18.2	1.48	28 11 2.5	1 33 44.49	0.258	7 53 2.0	1.47
29	1 33 41.15	0.257	7 52 42.8	1.47	29 10 58.4	1 33 38.34	0.257	7 52 26.8	1.46
30	1 33 35.00	0.256	7 52 7.7	1.46	30 10 54.4	1 33 32.22	0.256	7 51 51.9	1.46
31	1 33 28.88	0.255	7 51 32.8	1.45	31 10 50.4	1 33 26.12	0.254	7 51 17.2	1.44
32	1 33 22.79	-0.253	+ 7 50 58.1	- 1.44	32 10 46.3	1 33 20.06	-0.252	+ 7 50 42.7	- 1.43

Date. 1879.	FOR WASHINGTON MEAN NOON.				FOR MERIDIAN TRANSIT.				
	Apparent Right Ascension.	Diff. for 1 hour.	Apparent Declination.	Diff. for 1 hour.	Mean Time of Transit.	Apparent Right Ascension.	Diff. for 1 h. of Long.	Apparent Declination.	Diff. for 1 hour of Long.
Nov. 1	h m s	"	° ' "	"	d h m	h m s	"	° ' "	"
2	1 33 22.73	-0.253	+ 7 50 58.1	- 1.44	1 10 46.3	1 33 23.06	-0.252	+ 7 50 42.7	- 1.43
3	1 33 16.74	0.251	7 50 23.7	1.43	2 10 42.3	1 33 14.05	0.250	7 50 8.4	1.42
4	1 33 10.73	0.250	7 49 49.6	1.42	3 10 38.3	1 33 8.08	0.249	7 49 34.5	1.41
5	1 33 4.75	0.248	7 49 15.8	1.40	4 10 34.2	1 33 2.14	0.247	7 49 0.9	1.39
6	1 32 58.82	0.246	7 48 42.3	1.39	5 10 30.2	1 32 56.25	0.245	7 48 27.7	1.38
7	1 32 52.94	0.244	7 48 9.1	1.38	6 10 26.2	1 32 50.41	0.243	7 47 54.8	1.37
8	1 32 47.11	0.242	7 47 36.3	1.36	7 10 22.2	1 32 44.62	0.241	7 47 22.2	1.35
9	1 32 41.33	0.240	7 47 3.8	1.35	8 10 18.1	1 32 38.88	0.239	7 46 49.9	1.34
10	1 32 35.60	0.238	7 46 31.7	1.33	9 10 14.1	1 32 33.18	0.237	7 46 18.0	1.32
11	1 32 29.92	0.236	7 46 0.0	1.31	10 10 10.1	1 32 27.54	0.234	7 45 46.6	1.30
12	1 32 24.30	0.233	7 45 28.7	1.30	11 10 6.1	1 32 21.96	0.231	7 45 15.6	1.28
13	1 32 18.74	0.230	7 44 57.8	1.28	12 10 2.0	1 32 16.44	0.229	7 44 45.0	1.27
14	1 32 13.25	0.228	7 44 27.3	1.26	13 9 58.0	1 32 10.99	0.226	7 44 14.8	1.25
15	1 32 7.82	0.225	7 43 57.3	1.24	14 9 54.0	1 32 5.69	0.223	7 43 45.0	1.23
16	1 32 2.45	0.222	7 43 27.7	1.22	15 9 50.0	1 32 0.27	0.221	7 43 15.7	1.21
17	1 31 57.15	0.220	7 42 58.6	1.21	16 9 45.9	1 31 55.01	0.218	7 42 46.8	1.19
18	1 31 51.92	0.217	7 42 29.9	1.19	17 9 41.9	1 31 49.82	0.215	7 42 18.4	1.18
19	1 31 46.76	0.214	7 42 1.7	1.17	18 9 37.9	1 31 44.71	0.212	7 41 50.4	1.16
20	1 31 41.63	0.210	7 41 34.0	1.15	19 9 33.9	1 31 39.68	0.209	7 41 23.0	1.13
21	1 31 36.63	0.207	7 41 6.8	1.12	20 9 29.9	1 31 34.72	0.206	7 40 56.1	1.11
22	1 31 31.75	0.204	7 40 40.1	1.10	21 9 25.9	1 31 29.84	0.202	7 40 29.7	1.09
23	1 31 26.90	0.201	7 40 13.9	1.08	22 9 21.9	1 31 25.04	0.199	7 40 3.9	1.07
24	1 31 22.13	0.197	7 39 48.2	1.06	23 9 17.9	1 31 20.32	0.195	7 39 38.5	1.05
25	1 31 17.45	0.193	7 39 23.0	1.04	24 9 13.9	1 31 15.69	0.192	7 39 13.6	1.02
26	1 31 12.86	0.190	7 38 58.4	1.01	25 9 9.8	1 31 11.14	0.188	7 38 49.3	1.00
27	1 31 8.35	0.186	7 38 34.5	0.99	26 9 5.8	1 31 6.68	0.184	7 38 25.6	0.98
28	1 31 3.94	0.182	7 38 11.1	0.96	27 9 1.8	1 31 2.31	0.180	7 38 2.4	0.95
29	1 30 59.62	0.178	7 37 48.3	0.94	28 8 57.8	1 30 58.04	0.176	7 37 39.9	0.93
30	1 30 55.39	0.174	7 37 26.1	0.91	29 8 53.8	1 30 53.86	0.172	7 37 18.0	0.90
1	1 30 51.25	0.170	7 37 4.5	0.89	30 8 49.8	1 30 49.77	0.168	7 36 56.7	0.88
Dec. 1	1 30 47.22	0.166	7 36 43.5	0.86	1 8 45.8	1 30 45.78	0.164	7 36 36.0	0.85
2	1 30 43.28	0.162	7 36 23.1	0.83	2 8 41.8	1 30 41.89	0.160	7 36 15.9	0.82
3	1 30 39.45	0.158	7 36 3.4	0.81	3 8 37.8	1 30 38.11	0.156	7 35 56.5	0.80
4	1 30 35.72	0.153	7 35 44.4	0.78	4 8 33.8	1 30 34.43	0.151	7 35 37.7	0.77
5	1 30 32.10	0.149	7 35 26.0	0.75	5 8 29.9	1 30 30.85	0.147	7 35 19.6	0.74
6	1 30 28.58	0.144	7 35 8.3	0.73	6 8 25.9	1 30 27.38	0.142	7 35 2.2	0.71
7	1 30 25.17	0.140	7 34 51.2	0.70	7 8 21.9	1 30 24.02	0.138	7 34 45.4	0.69
8	1 30 21.87	0.136	7 34 34.8	0.67	8 8 17.9	1 30 20.76	0.134	7 34 29.3	0.66
9	1 30 18.67	0.131	7 34 19.1	0.64	9 8 13.9	1 30 17.61	0.129	7 34 13.8	0.63
10	1 30 15.59	0.126	7 34 4.1	0.61	10 8 10.0	1 30 14.58	0.124	7 33 59.1	0.60
11	1 30 12.63	0.121	7 33 49.8	0.58	11 8 6.0	1 30 11.67	0.119	7 33 45.1	0.57
12	1 30 9.78	0.117	7 33 36.1	0.55	12 8 2.0	1 30 8.86	0.115	7 33 31.7	0.54
13	1 30 7.04	0.112	7 33 23.2	0.52	13 7 58.0	1 30 6.17	0.110	7 33 19.1	0.51
14	1 30 4.42	0.107	7 33 11.1	0.49	14 7 54.1	1 30 3.59	0.105	7 33 7.2	0.48
15	1 30 1.91	0.102	7 32 59.7	0.46	15 7 50.1	1 30 1.13	0.100	7 32 56.1	0.45
16	1 29 59.52	0.097	7 32 49.0	0.43	16 7 46.1	1 29 58.78	0.095	7 32 45.7	0.42
17	1 29 57.25	0.092	7 32 39.9	0.40	17 7 42.1	1 29 56.55	0.090	7 32 35.9	0.39
18	1 29 55.11	0.087	7 32 30.7	0.37	18 7 38.2	1 29 54.45	0.085	7 32 26.9	0.36
19	1 29 53.08	0.082	7 32 21.2	0.34	19 7 34.2	1 29 52.47	0.080	7 32 18.7	0.33
20	1 29 51.17	0.077	7 32 13.5	0.31	20 7 30.3	1 29 50.61	0.075	7 32 11.2	0.30
21	1 29 49.39	0.072	7 32 6.4	0.28	21 7 26.3	1 29 48.87	0.070	7 32 4.4	0.27
22	1 29 47.73	0.067	7 32 0.1	0.25	22 7 22.3	1 29 47.26	0.065	7 31 58.4	0.24
23	1 29 46.20	0.061	7 31 54.6	0.21	23 7 18.4	1 29 45.77	0.060	7 31 53.1	0.21
24	1 29 44.79	0.056	7 31 49.8	0.18	24 7 14.4	1 29 44.40	0.055	7 31 48.5	0.18
25	1 29 43.51	0.051	7 31 45.8	0.15	25 7 10.5	1 29 43.16	0.049	7 31 44.7	0.15
26	1 29 42.35	0.046	7 31 42.6	0.12	26 7 6.5	1 29 42.04	0.044	7 31 41.7	0.11
27	1 29 41.32	0.040	7 31 40.1	0.09	27 7 2.6	1 29 41.05	0.039	7 31 39.5	0.08
28	1 29 40.42	0.035	7 31 38.4	0.05	28 6 58.6	1 29 40.19	0.033	7 31 38.0	0.05
29	1 29 39.65	0.029	7 31 37.5	- 0.02	29 6 54.7	1 29 39.46	0.028	7 31 37.3	- 0.01
30	1 29 39.01	0.024	7 31 37.4	+ 0.01	30 6 50.7	1 29 38.86	0.023	7 31 37.4	+ 0.02
31	1 29 38.50	0.019	7 31 38.0	0.04	31 6 46.8	1 29 38.38	0.017	7 31 38.3	0.05
32	1 29 38.12	-0.013	+ 7 31 39.4	+ 0.08	32 6 42.8	1 29 38.04	-0.012	+ 7 31 39.9	+ 0.08

HORIZONTAL PARALLAXES AND SEMIDIAMETERS.									
Mean Noon.	HORIZONTAL PARALLAXES.			SEMIDIAMETERS.			SID. TIME OF SEMIDIAMETER PASSING THE MERIDIAN.		
	♂	♀	♂	♂	♀	♂	♂	♀	♂
Jan. 1	13.12	10.17	4.19	4.94	9.83	2.39	0.35	0.68	0.17
6	12.77	9.77	4.15	4.82	9.44	2.37	0.34	0.66	0.17
11	11.58	9.39	4.12	4.37	9.07	2.35	0.31	0.64	0.16
16	10.31	9.04	4.09	3.89	8.74	2.33	0.28	0.62	0.16
21	9.29	8.72	4.05	3.50	8.43	2.32	0.25	0.60	0.16
26	8.49	8.43	4.02	3.21	8.15	2.30	0.23	0.58	0.16
31	7.90	8.17	3.99	2.98	7.89	2.28	0.21	0.56	0.15
Feb 5	7.45	7.92	3.96	2.81	7.66	2.26	0.20	0.55	0.15
10	7.10	7.69	3.93	2.68	7.44	2.25	0.19	0.54	0.15
15	6.84	7.48	3.90	2.58	7.23	2.23	0.18	0.52	0.15
20	6.65	7.29	3.88	2.51	7.04	2.21	0.17	0.50	0.15
25	6.52	7.11	3.85	2.46	6.87	2.20	0.17	0.49	0.15
Mar. 1	6.45	6.94	3.82	2.43	6.71	2.18	0.17	0.47	0.15
6	6.45	6.78	3.80	2.43	6.56	2.17	0.17	0.46	0.14
11	6.54	6.64	3.77	2.47	6.42	2.15	0.17	0.44	0.14
16	6.76	6.50	3.75	2.55	6.28	2.14	0.17	0.43	0.14
21	7.18	6.37	3.72	2.71	6.15	2.13	0.18	0.42	0.14
26	7.85	6.25	3.70	2.97	6.04	2.11	0.20	0.41	0.14
31	8.85	6.14	3.68	3.34	5.93	2.10	0.23	0.40	0.14
April 5	10.19	6.03	3.66	3.84	5.83	2.09	0.27	0.39	0.14
10	11.78	5.93	3.64	4.44	5.74	2.08	0.31	0.38	0.14
15	13.46	5.84	3.62	5.08	5.66	2.07	0.35	0.38	0.14
20	14.88	5.75	3.60	5.62	5.58	2.06	0.39	0.37	0.14
25	15.66	5.67	3.59	5.91	5.50	2.05	0.41	0.37	0.14
30	15.58	5.60	3.57	5.88	5.42	2.04	0.40	0.37	0.14
May 5	14.79	5.53	3.56	5.58	5.35	2.03	0.38	0.36	0.14
10	13.64	5.47	3.55	5.14	5.29	2.03	0.35	0.36	0.14
15	12.37	5.42	3.53	4.67	5.24	2.02	0.32	0.36	0.14
20	11.16	5.37	3.52	4.21	5.19	2.01	0.29	0.36	0.14
25	10.07	5.32	3.52	3.80	5.14	2.01	0.26	0.36	0.14
30	9.12	5.28	3.51	3.44	5.10	2.00	0.24	0.36	0.14
June 4	8.32	5.24	3.50	3.14	5.07	2.00	0.22	0.36	0.14
9	7.66	5.21	3.50	2.89	5.04	2.00	0.20	0.36	0.14
14	7.15	5.18	3.49	2.70	5.01	1.99	0.19	0.36	0.14
19	6.81	5.16	3.49	2.57	4.99	1.99	0.19	0.36	0.15
24	6.67	5.14	3.49	2.52	4.97	1.99	0.19	0.36	0.15
29	6.77	5.13	3.49	2.53	4.96	1.99	0.19	0.36	0.15
July 4	6.89	5.12	3.50	2.60	4.95	2.00	0.19	0.36	0.15
9	7.19	5.12	3.50	2.72	4.95	2.00	0.19	0.36	0.15
14	7.59	5.12	3.51	2.86	4.95	2.00	0.20	0.36	0.15
19	8.07	5.12	3.51	3.05	4.95	2.01	0.21	0.35	0.15
24	8.63	5.12	3.52	3.26	4.95	2.01	0.22	0.35	0.15
29	9.30	5.13	3.54	3.51	4.96	2.02	0.24	0.35	0.15
Aug. 3	10.08	5.14	3.55	3.80	4.97	2.03	0.26	0.35	0.15
8	10.97	5.16	3.57	4.14	4.99	2.04	0.28	0.35	0.15
13	11.98	5.19	3.59	4.52	5.02	2.05	0.30	0.35	0.15
18	13.03	5.22	3.61	4.92	5.05	2.06	0.33	0.35	0.15
23	13.89	5.25	3.63	5.24	5.08	2.07	0.35	0.34	0.15
28	14.17	5.28	3.66	5.35	5.12	2.09	0.36	0.34	0.15
Sept. 2	13.52	5.32	3.69	5.10	5.16	2.11	0.34	0.34	0.15
7	12.08	5.37	3.72	4.56	5.20	2.12	0.31	0.34	0.15
12	10.40	5.43	3.75	3.92	5.25	2.14	0.27	0.35	0.15
17	8.93	5.48	3.79	3.37	5.30	2.17	0.23	0.35	0.15
22	7.86	5.53	3.83	2.97	5.35	2.19	0.20	0.36	0.15
27	7.15	5.59	3.88	2.70	5.41	2.22	0.18	0.36	0.15
Oct. 2	6.69	5.66	3.93	2.53	5.47	2.24	0.17	0.37	0.15
7	6.41	5.74	3.98	2.42	5.55	2.27	0.16	0.38	0.16
12	6.26	5.82	4.04	2.36	5.63	2.31	0.16	0.39	0.16
17	6.19	5.91	4.10	2.34	5.71	2.34	0.16	0.40	0.16
22	6.19	6.00	4.17	2.34	5.80	2.38	0.16	0.41	0.16

## HORIZONTAL PARALLAXES AND SEMIDIAMETERS.

Mean Noon.	HORIZONTAL PARALLAXES.			SEMIDIAMETERS.			SID. TIME OF SEMIDIAMETER PASSING THE MERIDIAN.		
	♂	♀	♂	♂	♀	♂	♂	♀	♂
Oct. 27	6.24	6.09	4.24	2.36	5.89	2.42	0.16	0.42	0.16
Nov. 1	6.37	6.19	4.32	2.40	5.99	2.47	0.17	0.43	0.17
6	6.56	6.31	4.40	2.47	6.10	2.51	0.18	0.44	0.17
11	6.83	6.43	4.49	2.58	6.22	2.56	0.19	0.45	0.17
16	7.21	6.55	4.59	2.72	6.34	2.62	0.20	0.46	0.18
21	7.74	6.68	4.69	2.92	6.46	2.68	0.22	0.47	0.18
26	8.49	6.82	4.80	3.21	6.69	2.74	0.24	0.48	0.18
Dec. 1	9.53	6.98	4.92	3.60	6.75	2.81	0.27	0.49	0.19
6	10.91	7.15	5.05	4.12	6.91	2.89	0.30	0.50	0.19
11	12.38	7.33	5.19	4.67	7.09	2.97	0.34	0.51	0.20
16	13.07	7.52	5.34	4.94	7.28	3.05	0.35	0.52	0.20
21	12.39	7.73	5.50	4.68	7.47	3.14	0.33	0.53	0.21
26	11.62	7.95	5.63	4.16	7.63	3.24	0.30	0.54	0.22
31	9.74	8.18	5.87	3.68	7.91	3.35	0.26	0.55	0.22
Mean Noon.	♂	h	♂	♂	h	♂	♂	h	♂
Jan. 1	2.07	0.80	0.50	21.97	7.09	1.89	1.67	0.55	0.12
11	2.08	0.80	0.50	22.09	7.10	1.90	1.68	0.55	0.12
21	2.08	0.81	0.50	22.06	7.12	1.90	1.69	0.55	0.12
31	2.06	0.81	0.50	21.88	7.16	1.90	1.68	0.55	0.12
Feb. 10	2.03	0.82	0.50	21.54	7.22	1.89	1.65	0.56	0.12
20	1.98	0.83	0.50	21.08	7.29	1.88	1.62	0.56	0.12
Mar. 1	1.93	0.84	0.49	20.55	7.38	1.86	1.58	0.57	0.11
11	1.88	0.85	0.49	19.97	7.48	1.85	1.54	0.57	0.11
21	1.82	0.86	0.49	19.36	7.59	1.84	1.49	0.58	0.11
31	1.76	0.87	0.48	18.76	7.71	1.82	1.44	0.59	0.11
April 10	1.71	0.89	0.48	18.18	7.84	1.81	1.40	0.60	0.11
20	1.66	0.90	0.47	17.63	7.97	1.79	1.35	0.61	0.10
30	1.61	0.92	0.47	17.13	8.10	1.77	1.31	0.62	0.10
May 19	1.57	0.93	0.47	16.67	8.23	1.75	1.27	0.63	0.10
20	1.53	0.95	0.46	16.27	8.35	1.74	1.24	0.64	0.10
30	1.50	0.96	0.46	15.92	8.46	1.73	1.21	0.65	0.10
June 9	1.47	0.97	0.46	15.63	8.55	1.72	1.19	0.66	0.10
19	1.45	0.98	0.46	15.38	8.62	1.72	1.17	0.66	0.10
29	1.43	0.98	0.45	15.18	8.66	1.71	1.15	0.67	0.10
July 9	1.41	0.98	0.45	15.03	8.67	1.71	1.13	0.67	0.10
19	1.40	0.98	0.45	14.94	8.66	1.71	1.12	0.67	0.10
29	1.40	0.98	0.45	14.90	8.62	1.72	1.11	0.66	0.10
Aug. 8	1.40	0.97	0.46	14.89	8.55	1.72	1.11	0.66	0.10
18	1.40	0.96	0.46	14.93	8.46	1.72	1.11	0.65	0.10
28	1.41	0.95	0.46	15.03	8.35	1.73	1.11	0.64	0.10
Sept. 7	1.42	0.93	0.47	15.17	8.23	1.74	1.12	0.64	0.10
17	1.44	0.92	0.47	15.37	8.10	1.75	1.13	0.63	0.11
27	1.47	0.90	0.47	15.62	7.97	1.77	1.14	0.62	0.11
Oct. 7	1.50	0.89	0.48	15.92	7.84	1.78	1.16	0.60	0.11
17	1.53	0.87	0.48	16.26	7.71	1.80	1.18	0.59	0.11
27	1.57	0.86	0.48	16.66	7.59	1.82	1.21	0.59	0.11
Nov. 6	1.61	0.85	0.49	17.12	7.48	1.83	1.24	0.58	0.11
16	1.66	0.84	0.49	17.63	7.38	1.85	1.28	0.57	0.11
26	1.71	0.83	0.49	18.16	7.30	1.86	1.32	0.56	0.11
Dec. 6	1.76	0.82	0.50	18.72	7.23	1.87	1.36	0.56	0.12
16	1.81	0.81	0.50	19.29	7.17	1.88	1.40	0.55	0.12
26	1.86	0.81	0.50	19.84	7.13	1.89	1.44	0.55	0.12
36	1.91	0.81	0.50	20.36	7.11	1.90	1.48	0.55	0.12

Horizontal Parallax of Neptune, 0°.30, Jan. 1 to Jan. 22; July 8 to Sept. 11; after Nov. 21.

" " " 0°.29, Jan. 23 to July 7.

" " " 0°.31, Sept. 12 to Nov. 30.

# 390 SUN'S COÖRDINATES, 1872.

Date. 1872.	RECTANGULAR EQUATORIAL.						POLAR ECLIPTIC.			
	X.	X'.	Y.	Y'.	Z.	Z'.	$\lambda = \odot$ 's True Longitude.	$\lambda'$	$\beta = \odot$ 's Latitude.	Log. Rad. Vect. = $\rho$ .
Jan. 1.0	+1820188	0966	-8863813	3700	-3845992	5887	280° 40' 6.4"	23.0	+0.85	9.9 926501
1.5	1906072	6845	-8848639	8521	-3839408	9300	281 10 41.3	57.8	0.84	926516
2.0	1991812	2579	-8832776	2653	-3832526	2415	281 41 16.2	32.6	0.82	926537
2.5	2077400	8161	-8816225	6096	-3825346	5232	282 11 51.1	67.4	0.80	926564
3.0	2162830	3585	-8798987	8852	-3817869	7753	282 42 26.1	42.3	0.77	926597
3.5	2248096	8845	-8781063	0923	-3810095	19976	283 13 1.1	17.2	0.73	926636
4.0	2333191	3934	-8762455	2310	-3802024	1902	283 43 36.2	52.2	0.69	926680
4.5	2418107	8844	-8743163	3013	-3793657	3533	284 14 11.4	27.3	0.64	926729
5.0	2502838	3569	-8723189	3034	-3784993	4867	284 44 46.6	62.4	0.59	926783
5.5	2587377	8102	-8702533	2373	-3776035	5906	285 15 21.8	37.5	0.53	926842
6.0	2671718	2437	-8681197	1032	-3766781	6650	285 45 57.0	72.6	0.47	926906
6.5	2755853	6566	-8659183	9013	-3757232	7099	286 16 32.2	47.7	0.40	926976
7.0	2839775	0482	-8636491	6317	-3747388	7253	286 47 7.5	22.9	0.33	927047
7.5	2923477	4178	-8613124	2945	-3737252	7114	287 17 42.7	58.0	0.26	927124
8.0	3006953	7648	-8589083	8899	-3726824	6684	287 48 17.9	33.1	0.20	927206
8.5	3090196	0885	-8564370	4182	-3716105	5963	288 18 53.1	68.2	0.13	927292
9.0	3173198	3881	-8538986	8794	-3705095	4951	288 49 28.2	43.3	+0.07	927383
9.5	3255052	6629	-8512935	2739	-3693796	3650	289 20 3.2	18.2	0.00	927478
10.0	3338452	9123	-8486219	6019	-3682207	2059	289 50 38.1	53.0	-0.06	927577
10.5	3420691	1356	-8458839	8635	-3670330	0180	290 21 13.0	27.8	0.12	927680
11.0	3502662	3321	-8430797	0589	-3658166	8014	290 51 47.8	62.6	0.17	927786
11.5	3584357	5010	-8402095	1883	-3645716	5562	291 22 22.5	37.2	0.22	927897
12.0	3665771	6418	-8372738	2522	-3632981	2825	291 52 57.0	71.6	0.26	928012
12.5	3746898	7539	-8342728	2508	-3619962	9804	292 23 3.4	45.9	0.29	928131
13.0	3827730	8365	-8312066	1843	-3606661	6501	292 54 57.7	20.1	0.32	928254
13.5	3908261	8890	-8280757	0530	-3593078	2916	293 24 39.8	54.1	0.34	928382
14.0	3988485	9108	-8248804	8573	-3579214	9050	293 55 13.7	27.9	0.35	928514
14.5	4068395	9012	-8216209	5975	-3565072	4906	294 25 47.4	61.5	0.35	928650
15.0	4147984	8594	-8182974	2737	-3550653	0486	294 56 21.0	35.0	0.35	928791
15.5	4227247	7850	-8149104	8864	-3535957	5788	295 26 54.4	68.3	0.34	928937
16.0	4306172	6775	-8114602	4359	-3520985	0814	295 57 27.6	41.4	0.33	929088
16.5	4384771	5362	-8079470	9224	-3505740	5567	296 28 0.6	14.3	0.31	929244
17.0	4463020	3605	-8043710	3461	-3490224	0050	296 58 33.2	47.0	0.28	929405
17.5	4540917	1496	-8007329	7077	-3474436	4260	297 29 5.7	19.3	0.24	929572
18.0	4618458	9031	-7970328	0073	-3458378	8200	297 59 38.0	51.5	0.20	929744
18.5	4695637	6204	-7932709	2451	-3442052	1873	298 30 10.1	23.5	0.15	929922
19.0	4772448	3008	-7894476	4215	-3425461	5281	299 0 41.9	55.3	0.09	930105
19.5	4848885	9439	-7855634	5370	-3408604	8422	299 31 13.5	26.8	-0.03	930294
20.0	4924943	5491	-7816185	5918	-3391483	1299	300 1 44.8	58.0	+0.03	930489
20.5	5000617	1159	-7775132	5863	-3374100	3915	300 32 15.9	29.0	0.09	930690
21.0	5075900	6436	-7735477	5206	-3356457	6271	301 2 46.8	59.9	0.16	930898
21.5	5150789	1319	-7694226	3952	-3338555	8367	301 33 17.4	30.4	0.22	931112
22.0	5225279	5803	-7652381	2105	-3320395	0206	302 3 47.8	60.7	0.29	931332
22.5	5299363	9881	-7609945	9667	-3301979	1789	302 34 17.9	30.7	0.35	931550
23.0	5373035	3546	-7566922	6642	-3283309	3118	303 4 47.8	69.6	0.41	931792
23.5	5446292	6797	-7523316	3033	-3264386	4194	303 35 17.4	30.1	0.47	932032
24.0	5519129	9628	-7479131	8846	-3245211	5018	304 5 46.8	59.4	0.52	932279
24.5	5591539	2032	-7434370	4083	-3225787	5593	304 36 16.0	28.5	0.57	932533
25.0	5663517	4004	-7389036	8747	-3206115	5920	305 6 45.1	57.6	0.62	932793
25.5	5735059	5544	-7343132	2841	-3186196	6900	305 37 13.9	26.3	0.66	933063
26.0	5806160	6635	-7296662	6369	-3166031	5834	306 7 42.5	54.8	0.69	933334
26.5	5876814	7283	-7249630	9335	-3145622	5424	306 38 10.8	23.0	0.71	933614
27.0	5947016	7479	-7202039	1742	-3124972	4774	307 8 38.9	51.1	0.73	933900
27.5	6016761	7218	-7153892	3593	-3104080	3881	307 39 6.8	18.9	0.74	934193
28.0	6086044	6495	-7105192	4891	-3082948	2748	308 9 24.5	46.5	0.75	934492
28.5	6154860	5305	-7055943	5640	-3061579	1378	308 40 2.0	13.9	0.75	934797
29.0	6223205	3645	-7006149	5845	-3039974	9773	309 10 29.4	41.3	0.74	935109
29.5	6291072	1506	-6955812	5506	-3018134	7932	309 40 56.5	68.3	0.72	935426
30.0	6358457	8885	-6904936	4628	-2996060	5857	310 11 23.4	35.1	0.70	935749
30.5	6425354	5776	-6853526	3217	-2973754	3551	310 41 50.2	61.8	0.67	936078
31.0	+6491758	2174	-6801584	1274	-2951219	1016	311 12 16.8	28.4	+0.63	936412

NOTE.—The accented letters correspond to the mean equinox and equator of January 0d.0.

# SUN'S COÖRDINATES, 1872. 391

Date. 1872.	RECTANGULAR EQUATORIAL.						POLAR ECLIPTIC.			
	X.	X'.	Y.	Y'.	Z.	Z'.	$\lambda = \odot$ 's True Longitude.	$\lambda'$	$\beta = \odot$ 's Latitude.	Log. Rad. Vect. = $\rho$ .
Jan. 31.5	+6557663	8073	-6749114	8803	-2928455	8251	311° 42' 43.2"	54.7	+0.58	9.96751
Feb. 1.0	6623065	3469	6696120	5808	2905463	5258	312 13 9.4	20.8	0.53	9.937095
1.5	6687959	8357	6642604	2291	2882245	2040	312 43 35.3	46.6	0.48	9.937444
2.0	6752339	2732	6588571	8257	2858805	8600	313 14 1.0	12.3	0.42	9.937797
2.5	6816199	6586	6534028	3713	2835142	4936	313 44 26.5	37.7	0.36	9.938155
3.0	6879535	9916	6478977	8661	2811259	1053	314 14 51.8	62.9	0.29	9.938517
3.5	6942345	2717	6423422	3105	2787157	6951	314 45 16.9	27.9	0.22	9.938883
4.0	7004615	4185	6367368	7050	2762839	2633	315 15 41.8	52.8	0.15	9.939253
4.5	7066348	6712	6310820	0501	2738306	8100	315 46 6.3	17.2	0.08	9.939627
5.0	7127536	7894	6253782	3462	2713560	3354	316 16 30.6	41.4	+0.02	9.940005
5.5	7188174	8527	6196258	5937	2688604	8398	316 46 54.7	65.4	-0.05	9.940386
6.0	7248257	8605	6139252	7931	2663439	3232	317 17 18.6	29.3	0.11	9.940770
6.5	7307781	8123	6079770	9448	2638067	7860	317 47 42.1	52.7	0.17	9.941158
7.0	7366740	7076	6020816	0493	2612490	2283	318 18 5.3	15.8	0.22	9.941549
7.5	7425129	5406	5961394	1073	2586710	6503	318 48 28.3	38.7	0.27	9.941943
8.0	7482943	3269	5901510	1186	2560729	0522	319 18 51.0	61.4	0.32	9.942339
8.5	7540178	0498	5841169	0844	2534550	4343	319 49 13.3	23.6	0.36	9.942738
9.0	7596830	7145	5780376	0050	2508174	7967	320 19 35.3	45.5	0.39	9.943140
9.5	7652895	3205	5719136	8810	2481693	1396	320 49 56.9	67.1	0.42	9.943545
10.0	7708367	8672	5657455	7129	2454840	4633	321 20 18.2	28.4	0.44	9.943953
10.5	7763242	3541	5595338	5011	2427889	7682	321 50 39.1	49.2	0.45	9.944363
11.0	7817517	7811	5532790	2463	2400750	0543	322 20 59.6	69.6	0.45	9.944776
11.5	7871187	1476	5469817	9490	2373425	3218	322 51 19.7	29.6	0.44	9.945192
12.0	7924247	4531	5406424	6097	2345918	5712	323 21 39.4	49.3	0.43	9.945612
12.5	7976694	6972	5342616	2288	2318231	8025	323 51 58.6	68.4	0.41	9.946034
13.0	8028525	8798	5279400	8072	2290365	0159	324 22 17.4	27.1	0.38	9.946450
13.5	8079735	2003	5213780	3452	2262324	2118	324 52 35.8	45.4	0.35	9.946887
14.0	8130322	0585	5148761	8433	2234111	3906	325 22 53.8	63.4	0.31	9.947319
14.5	8180281	0539	5083349	3021	2205726	5521	325 53 11.4	20.9	0.26	9.947754
15.0	8229610	9863	5017551	7223	2177172	6968	326 23 28.5	37.9	0.21	9.948192
15.5	8278305	8553	4951371	1043	2148453	8249	326 53 45.2	54.5	0.16	9.948634
16.0	8326362	6605	4884814	4486	2119571	9368	327 24 1.5	10.8	0.10	9.949079
16.5	8373780	4018	4817886	7558	2090527	0324	327 54 17.3	26.5	-0.04	9.949528
17.0	8420555	0788	4750592	0264	2061323	1121	328 24 32.6	41.7	+0.03	9.949981
17.5	8466683	6911	4682937	2609	2031964	1762	328 54 47.4	56.5	0.10	9.950439
18.0	8512162	2386	4614926	4599	2002451	2250	329 25 1.8	10.9	0.16	9.950901
18.5	8556990	7209	4546567	6240	1972786	2585	329 55 15.7	24.7	0.22	9.951367
19.0	8601163	1377	4477864	7537	1942971	2771	330 25 29.1	38.0	0.28	9.951838
19.5	8644678	4887	4408822	8495	1913009	2810	330 55 42.1	51.0	0.34	9.952312
20.0	8687533	7738	4339445	9119	1882904	2706	331 25 54.6	63.5	0.39	9.952791
20.5	8729726	9929	4269740	9414	1852657	2458	331 56 6.7	15.5	0.44	9.953275
21.0	8771254	1452	4199713	9387	1822270	2073	332 26 18.3	27.0	0.49	9.953763
21.5	8812114	2307	4129368	9043	1791746	1550	332 56 29.4	38.0	0.53	9.954256
22.0	8852304	2491	4058711	8387	1761087	0892	333 26 40.1	48.7	0.57	9.954753
22.5	8891821	2003	3987747	7423	1730294	0100	333 56 50.3	58.8	0.60	9.955256
23.0	8930664	0841	3916481	6158	1699370	9177	334 27 0.1	8.5	0.62	9.955763
23.5	8968829	9002	3844918	4595	1668317	8125	334 57 9.5	17.9	0.63	9.956275
24.0	9006313	6482	3773063	2741	1637138	6947	335 27 18.5	26.9	0.64	9.956792
24.5	9043115	3279	3700921	0599	1605834	5644	335 57 27.1	35.4	0.64	9.957314
25.0	9079232	3392	3628497	8176	1574409	4220	336 27 35.3	43.5	0.63	9.957840
25.5	9114662	4818	3555796	5476	1542864	2676	336 57 43.0	51.2	0.61	9.958371
26.0	9149402	9554	3482823	2504	1511202	1015	337 27 50.3	58.5	0.59	9.958906
26.5	9183449	3596	3409585	9266	1479424	9238	337 57 57.3	65.4	0.56	9.959445
27.0	9216802	6945	3336087	5769	1447534	7349	338 28 3.9	11.9	0.52	9.959989
27.5	9249458	9597	3262334	2017	1415534	5350	338 58 10.0	18.0	0.48	9.960537
28.0	9281414	1549	3188330	8014	1383426	3244	339 28 15.7	23.7	0.43	9.961088
28.5	9312667	2798	3114082	3767	1351212	1031	339 58 21.1	29.0	0.37	9.961642
29.0	9343216	3343	3039594	9280	1318894	8714	340 28 26.1	33.9	0.31	9.962200
29.5	9373058	3181	2964873	4560	1286475	6296	340 58 30.7	38.5	0.25	9.962762
Mar. 1.0	9402191	2310	2889924	9612	1253958	3781	341 28 34.8	42.6	0.19	9.963326
1.5	+9430611	0726	-2814752	4441	-1221344	1168	341 58 38.6	46.3	+0.12	9.963893

NOTE.—+ denotes a change in the preceding figure.

# 392 SUN'S COÖRDINATES, 1872.

RECTANGULAR EQUATORIAL.							POLAR ECLIPTIC.				
Date.	X.	X'.	Y.	Y'.	Z.	Z'.	$\lambda = \odot$ 's True Longitude.	$\lambda'$	$\beta = \odot$ 's Latitude.	Log. Rad. Vect. = $\rho$ .	
1872.											
Mar. 2.0	+9458318	8429	-2739364	9054	-1188635	8460	342° 28' 42.0	49.7	+0.05	9.9 964463	
2.5	.9485310	5417	.2663764	3455	.1155836	5662	342 58 45.0	52.6	-0.02	965035	
3.0	.9511582	1686	.2-87957	7649	.1122948	2776	343 28 47.7	55.3	0.09	965610	
3.5	.9537133	7233	.2511951	1644	.1089972	9801	343 58 49.9	57.4	0.16	966186	
4.0	.9561962	2058	.2435752	5446	.1056912	6743	344 28 51.7	59.2	0.22	966764	
4.5	.9586068	6160	.2359365	9063	.1023770	3602	344 58 53.1	60.7	0.28	967344	
5.0	.9609447	9536	.2282796	2492	.0990549	0383	345 28 54.2	61.6	0.33	967926	
5.5	.9632098	2183	.2206051	5748	.0957251	7086	345 58 54.8	62.1	0.38	968510	
6.0	.9654019	4100	.2129137	8835	.0923879	3716	346 28 55.0	62.3	0.43	969095	
6.5	.9675207	5285	.2052058	1757	.0890435	0273	346 58 54.8	62.0	0.47	969680	
7.0	.9695660	5735	.1974821	4521	.0856923	6763	347 28 54.1	61.3	0.50	970266	
7.5	.9715378	5449	.1897433	7134	.0823345	3186	347 58 52.9	60.0	0.53	970853	
8.0	.9734359	4427	.1819900	9602	.0789703	9546	348 28 51.3	58.4	0.55	971441	
8.5	.9752602	2667	.1742228	1931	.0756001	5845	348 58 49.3	56.3	0.56	972029	
9.0	.9770106	0168	.1664423	4128	.0722241	2087	349 28 46.8	53.8	0.57	972618	
9.5	.9786869	6927	.1586492	6198	.0688426	8273	349 58 43.7	50.6	0.56	973207	
10.0	.9802889	2944	.1508441	8148	.0654559	4408	350 28 40.2	47.1	0.55	973796	
10.5	.9818166	8218	.1430278	9986	.0620642	0493	350 58 36.2	43.0	0.52	974385	
11.0	.9832700	2749	.1352008	1718	.0586679	6532	351 28 31.7	38.5	0.50	974974	
11.5	.9846490	6535	.1273637	3348	.0552672	2526	351 58 26.6	33.3	0.47	975564	
12.0	.9859536	9578	.1195172	4885	.0518624	8480	352 28 21.0	27.7	0.43	976154	
12.5	.9871836	1875	.1116620	6334	.0484537	4395	352 58 14.8	21.4	0.39	976745	
13.0	.9883300	3426	.1037988	7705	.0450414	0274	353 28 8.1	14.7	0.34	977336	
13.5	.9894199	4232	.0959282	8999	.0416259	6121	353 58 0.8	7.3	0.29	977928	
14.0	.9904263	4293	.0880506	0225	.0382073	1937	354 27 53.0	59.5	0.23	978520	
14.5	.9913580	3607	.0801666	1386	.0347860	7726	354 57 44.6	51.0	0.17	979113	
15.0	.9922150	2174	.0722767	2491	.0313623	3491	355 27 35.6	42.0	0.11	979707	
15.5	.9929976	9996	.0643821	3544	.0279363	9233	355 57 26.0	32.3	-0.05	980302	
16.0	.9937055	7073	.0564828	4553	.0245083	4955	356 27 15.9	22.1	+0.02	980898	
16.5	.9943390	3405	.0485796	5522	.0210787	0661	356 57 5.3	11.5	0.09	981495	
17.0	.9948979	8992	.0406730	6458	.0176477	6353	357 26 54.1	60.3	0.15	982093	
17.5	.9953822	3832	.0327637	7366	.0142155	2033	357 56 42.3	48.4	0.21	982692	
18.0	.9957920	7927	.0248523	8254	.0107824	7704	358 26 30.0	36.1	0.27	983293	
18.5	.9961274	1279	.0169394	9127	.0073486	3368	358 56 17.1	23.1	0.32	983895	
19.0	.9963883	3886	.0090256	9991	.0039145	9029	359 26 3.5	9.5	0.37	984498	
19.5	.9965750	5750	-.0011114	0850	-.0004802	4688	359 55 49.4	55.3	0.41	985103	
20.0	.9966875	6873	+.0068025	8287	+.0029540	9652	0 25 34.8	40.7	0.45	985710	
20.5	.9967258	7254	.0147157	7417	.0063878	3988	0 55 19.6	25.4	0.48	986319	
21.0	.9966900	6893	.0226277	6535	.0098209	8317	1 25 3.7	9.5	0.51	986931	
21.5	.9965801	5792	.0305377	5634	.0132532	2638	1 54 47.3	53.0	0.53	987545	
22.0	.9963963	3952	.0384452	4707	.0166845	6949	2 24 30.4	36.1	0.54	988161	
22.5	.9961386	1373	.0463497	3750	.0201143	1245	2 54 13.0	18.6	0.54	988778	
23.0	.9958070	8054	.0542505	2756	.0235425	5525	3 23 55.1	60.7	0.54	989397	
23.5	.9954016	3998	.0621473	1722	.0269690	9788	3 53 36.7	42.2	0.52	990019	
24.0	.9949225	9205	.0700396	0643	.0303935	4031	4 23 17.7	23.2	0.50	990643	
24.5	.9943697	3675	.0779267	9512	.0338157	8251	4 52 58.2	63.6	0.47	991269	
25.0	.9937432	7407	.0858080	8323	.0372354	2445	5 22 38.2	43.6	0.44	991896	
25.5	.9930431	0404	.0936831	7072	.0406524	6613	5 52 17.7	23.0	0.40	992525	
26.0	.9922696	2667	.1015515	5754	.0440665	0752	6 21 56.7	62.0	0.35	993156	
26.5	.9914226	4195	.1094126	4363	.0474773	4858	6 51 35.3	40.5	0.30	993789	
27.0	.9905023	4991	.1172659	2894	.0508846	8929	7 21 13.4	18.6	0.24	994424	
27.5	.9895089	5055	.1251107	1340	.0542882	2963	7 50 51.0	56.1	0.18	995063	
28.0	.9884423	4387	.1329465	9696	.0576879	6958	8 20 28.1	33.2	0.11	995697	
28.5	.9873025	2987	.1407728	7957	.0610834	0911	8 50 4.8	9.8	+0.05	996336	
29.0	.9860897	0858	.1485889	6116	.0644745	4819	9 19 41.0	46.0	-0.02	996976	
29.5	.9848039	7998	.1563944	4169	.0678610	8682	9 49 16.8	21.7	0.09	997617	
30.0	.9834452	4410	.1641887	2110	.0712427	2497	10 18 52.1	57.0	0.16	998258	
30.5	.9820137	0093	.1719712	9933	.0746193	6261	10 48 27.0	31.8	0.22	998900	
31.0	.9805094	5049	.1797412	7631	.0779905	1971	11 18 1.4	6.2	0.28	999541	
31.5	.9789325	9278	.1874983	5200	.0813561	3625	11 47 35.4	40.1	0.34	100182	
Apr. 1.0	+.9772831	2783	+.1952419	2634	+.0847159	7221	12 17 9.0	13.6	-0.39	000822	

◆ The first figures of this and the following logarithms are 0.0.

# SUN'S COÖRDINATES, 1872. 393

Date. 1872.	RECTANGULAR EQUATORIAL.						POLAR ECLIPTIC.			
	X.	X'.	Y.	Y'.	Z.	Z'.	$\lambda = \odot$ 's True Longitude.	$\lambda'$	$\beta = \odot$ 's Latitude.	Log. Rad. Vect. = $\rho$ .
Apr. 1.5	+9755613	5564	+2029715	9928	+0880696	0756	12° 46' 42"	46.6	-0.44	0.001462
2.0	.9737673	7622	.2106864	7075	.0914170	4227	13 16 14.8	19.3	0.49	002102
2.5	.9719010	8957	.2183860	4069	.0947577	7631	13 45 47.1	51.5	0.53	002740
3.0	.9699626	9572	.2260697	0904	.0980916	0968	14 15 18.9	23.2	0.57	003377
3.5	.9679523	9468	.2337371	7576	.1014184	4234	14 44 50.3	54.6	0.60	004013
4.0	.9658703	8647	.2413875	4077	.1047379	7427	15 14 21.2	25.5	0.62	004648
4.5	.9637167	7110	.2490202	0402	.1080496	0542	15 43 51.6	55.8	0.64	005282
5.0	.9614918	4860	.2566347	6545	.1113535	3578	16 13 21.6	25.8	0.65	005914
5.5	.9591956	1877	.2642303	2499	.1146493	6534	16 42 51.1	55.2	0.65	006544
6.0	.9568223	8223	.2718064	8257	.1179368	9407	17 12 20.1	24.2	0.64	007172
6.5	.9543902	3841	.2793626	3817	.1212155	2192	17 41 48.6	52.6	0.62	007797
7.0	.9518815	8753	.2868982	9171	.1244854	4888	18 11 16.7	20.7	0.59	008420
7.5	.9493024	2961	.2944126	4313	.1277462	7494	18 40 44.3	48.2	0.56	009041
8.0	.9466530	6467	.3019052	9236	.1309975	0005	19 10 11.4	15.3	0.53	009660
8.5	.9439337	9273	.3093754	3036	.1342392	2420	19 39 37.9	41.7	0.49	010277
9.0	.9411447	1382	.3168227	8407	.1374710	4736	20 9 3.9	7.7	0.44	010891
9.5	.9382962	2797	.3242465	2642	.1406925	6949	20 38 20.4	33.1	0.39	011502
10.0	.9353583	3520	.3316463	6637	.1439036	9058	21 7 54.4	58.1	0.33	012111
10.5	.9323620	3554	.3390214	0386	.1471040	1059	21 37 18.8	22.4	0.27	012717
11.0	.9292970	2903	.3463713	3883	.1502936	2953	22 6 42.7	46.2	0.20	013321
11.5	.9261636	1569	.3536955	7123	.1534720	4735	22 36 6.1	9.5	0.14	013924
12.0	.9229620	9553	.3609933	0098	.1566389	6402	23 5 29.9	32.3	-0.07	014524
12.5	.9196929	6861	.3682643	2806	.1597942	7953	23 34 51.1	54.4	0.00	015122
13.0	.9163565	3497	.3755080	5241	.1629377	9386	24 4 12.8	16.1	+0.06	015718
13.5	.9129530	9462	.3827238	7397	.1660691	0698	24 33 33.9	37.1	0.12	016312
14.0	.9094827	4759	.3899111	9267	.1691881	1886	25 2 54.4	57.6	0.18	016904
14.5	.9059460	9392	.3970696	0850	.1722945	2947	25 32 14.4	17.5	0.23	017494
15.0	.9023432	3364	.4041988	2140	.1753882	3882	26 1 33.9	37.0	0.28	018082
15.5	.8986747	6679	.4112982	3131	.1784690	4688	26 30 52.8	55.8	0.33	018668
16.0	.8949408	9341	.4183673	3819	.1815366	5369	27 0 11.1	14.1	0.37	019253
16.5	.8911417	1350	.4254056	4200	.1845908	5902	27 29 28.9	31.8	0.40	019838
17.0	.8872779	2712	.4324227	4269	.1876315	6307	27 58 46.1	49.0	0.43	020421
17.5	.8833497	3430	.4393889	4019	.1906584	6574	28 28 2.8	5.6	0.45	021003
18.0	.8793574	3508	.4463311	3447	.1936710	6698	28 57 19.0	21.8	0.47	021584
18.5	.8753013	2947	.4532416	2550	.1966695	6681	29 26 34.6	37.3	0.48	022164
19.0	.8711818	1752	.4601190	1322	.1996536	6520	29 55 49.6	52.3	0.48	022743
19.5	.8669993	9928	.4669628	9757	.2026231	6213	30 25 4.2	6.8	0.47	023322
20.0	.8627542	7477	.4737725	7851	.2055779	5758	30 54 18.3	20.9	0.46	023900
20.5	.8584467	4403	.4805477	5601	.2085176	5153	31 23 31.9	34.4	0.44	024478
21.0	.8540772	0709	.4872881	3003	.2114421	4396	31 52 44.9	47.3	0.41	025055
21.5	.8496460	6398	.4939931	0050	.2143512	3485	32 21 57.4	59.7	0.38	025630
22.0	.8451534	1473	.5006622	6738	.2172448	2419	32 51 9.4	11.7	0.34	026206
22.5	.8405997	5936	.5072952	3066	.2201226	1195	33 20 21.0	23.2	0.29	026781
23.0	.8359853	9793	.5138915	9027	.2229845	9812	33 49 32.1	34.2	0.24	027356
23.5	.8313106	3045	.5204508	4617	.2258304	8269	34 18 42.8	44.9	0.18	027930
24.0	.8265758	5700	.5269726	9832	.2286601	6564	34 47 53.0	55.0	0.12	028504
24.5	.8217813	7756	.5334566	4670	.2314733	4694	35 17 2.8	4.7	+0.05	029076
25.0	.8169274	9218	.5399024	9126	.2342699	2658	35 46 12.2	14.0	-0.02	029648
25.5	.8120144	0089	.5463095	3194	.2370497	0454	36 15 21.2	22.9	0.09	030219
26.0	.8070426	0373	.5526774	6870	.2398124	8079	36 44 29.8	31.5	0.15	030789
26.5	.8020124	0972	.5590055	0149	.2425580	5533	37 13 38.0	39.6	0.22	031357
27.0	.7969241	9190	.5652936	3028	.2452862	2813	37 42 45.8	47.4	0.28	031924
27.5	.7917782	7733	.5715412	5502	.2479967	9916	38 11 53.2	54.7	0.34	032489
28.0	.7865749	5702	.5777478	7565	.2506894	6841	38 41 0.3	1.8	0.40	033052
28.5	.7813146	3100	.5839120	9214	.2533642	3588	39 10 7.0	8.4	0.45	033613
29.0	.7759978	9934	.5900362	0445	.2560209	0153	39 39 13.3	14.7	0.50	034172
29.5	.7706246	6204	.5961171	1251	.2586591	6533	40 8 19.2	20.5	0.54	034729
30.0	.7651955	1915	.6021552	1629	.2612739	2729	40 37 24.7	26.0	0.58	035284
30.5	.7597110	7072	.6081500	1575	.2638799	8738	41 6 29.9	31.1	0.61	035836
May 1.5	.7541714	1678	.6141012	1085	.2664620	4557	41 35 34.7	35.8	0.64	036385
1.5	+7485770	6736	+6200083	0154	+2690250	0185	42 4 39.1	40.2	-0.66	036931

NOTE.—+ denotes a change in the preceding figure.



# 394 SUN'S COÖRDINATES, 1872.

Date.	RECTANGULAR EQUATORIAL.						POLAR ECLIPTIC.			
1872.	X.	X'.	Y.	Y'.	Z.	Z'.	$\lambda = \odot$ 's True Longitude.	$\lambda'$	$\beta = \odot$ 's Latitude.	Log. Rad. Vect. = $\rho$ .
May 2.0	+7429281	9249	+6258708	8776	+2715688	5621	42° 33' 43.2"	44.2	-0.67	0.0
2.5	7372254	2224	6316883	6949	2740930	0862	43 2 46.9	47.8	0.67	037473
3.0	7314692	4664	6374674	4668	2765976	5907	43 31 50.3	51.2	0.66	038012
3.5	7256598	6572	6431865	1927	2790823	0752	44 0 53.4	54.2	0.65	038547
4.0	7197977	7953	6488663	8722	2815470	5398	44 29 56.1	56.8	0.63	039078
4.5	7138834	8812	6544993	5050	2839914	9840	44 58 58.4	59.0	0.61	039604
5.0	7079173	9153	6600852	0907	2864153	4077	45 28 0.4	0.9	0.58	040126
5.5	7018999	8981	6656226	6289	2888186	8108	45 57 1.9	2.3	0.54	040644
6.0	6958316	8301	6711139	1189	2912011	1931	46 26 3.0	3.4	0.49	041158
6.5	6897130	7117	6765556	5604	2935626	5545	46 55 3.8	4.1	0.43	041667
7.0	6835445	5434	6819485	9531	2959029	8947	47 24 4.2	4.4	0.37	042172
7.5	6773266	3258	6872921	2965	2982218	2134	47 53 4.1	4.2	0.31	042672
8.0	6710597	0592	6925860	5902	3005192	5106	48 22 3.6	3.7	0.25	043167
8.5	6647444	7441	6978298	8338	3027949	7862	48 51 2.8	2.8	0.18	043657
9.0	6583814	3814	7030232	0270	3050457	0309	49 20 1.6	1.5	0.11	044143
9.5	6519710	9713	7081659	1695	3072804	2714	49 48 59.9	59.8	-0.04	044625
10.0	6455137	5143	7132573	2607	3094899	4897	50 17 57.8	57.6	+0.02	045101
10.5	6390102	0111	7182972	3004	3116771	6678	50 46 55.3	55.1	0.08	045572
11.0	6324699	4621	7232853	2883	3138418	8324	51 15 52.4	52.1	0.14	046039
11.5	6258664	8679	7282212	2240	3159838	9743	51 44 49.1	48.7	0.20	046502
12.0	6192272	2290	7331046	1073	3181029	0932	52 13 45.3	44.8	0.25	046963
12.5	6125438	5459	7379352	9377	3201991	1893	52 42 41.0	40.5	0.30	047413
13.0	6058168	8192	7427126	7149	3222723	2624	53 11 36.3	35.7	0.34	047862
13.5	5990466	0493	7474365	4386	3243223	3123	53 40 31.2	30.5	0.38	048307
14.0	5922338	2369	7521068	1088	3263489	3387	54 9 25.6	24.8	0.41	048748
14.5	5853790	3824	7567230	7249	3283527	3417	54 38 19.6	18.8	0.43	049185
15.0	5784827	4364	7612849	2867	3303315	3211	55 7 13.2	12.3	0.45	049619
15.5	5715453	5493	7657923	7939	3322874	2769	55 36 6.4	5.4	0.46	050049
16.0	5645674	5718	7702449	2463	3342195	2089	56 4 59.3	58.2	0.46	050475
16.5	5575496	5543	7746423	6436	3361276	1169	56 33 51.7	50.6	0.45	050898
17.0	5504924	4975	7789845	9857	3380116	0008	57 2 43.7	42.5	0.44	051317
17.5	5433961	4016	7832711	2721	3398715	8636	57 31 35.3	34.0	0.42	051733
18.0	5362614	2673	7875018	5026	3417071	6961	58 0 26.5	25.1	0.39	052146
18.5	5290889	0951	7916764	6770	3435183	5072	58 29 17.3	15.9	0.36	052557
19.0	5218791	8857	7957947	7952	3453051	2939	58 58 7.7	6.2	0.32	052965
19.5	5146324	6394	7998564	8568	3470673	0560	59 26 57.7	56.1	0.27	053370
20.0	5073493	3567	8038612	9615	3488047	7933	59 55 47.4	45.7	0.22	053772
20.5	5000304	0322	8078389	8391	3505174	5059	60 24 36.7	35.0	0.16	054172
21.0	4926764	6844	8116994	6996	3522052	1936	60 53 25.6	23.8	0.10	054569
21.5	4852873	2950	8155325	5325	3538630	8563	61 22 14.3	12.4	+0.04	054963
22.0	4778640	8730	8193078	3077	3555057	4940	61 51 2.7	0.7	-0.03	055355
22.5	4704068	4162	8230250	0248	3571183	1065	62 19 50.8	48.8	0.10	055744
23.0	4629163	9261	8266840	6237	3587056	6937	62 48 38.6	36.5	0.16	056131
23.5	4553931	4033	8302946	2842	3602675	2555	63 17 26.0	23.8	0.22	056515
24.0	4478376	8432	8338264	9260	3618039	7919	63 46 13.2	10.9	0.28	056896
24.5	4402501	2611	8373093	3088	3633148	3027	64 14 60.1	57.8	0.34	057275
25.0	4326314	6428	8407331	7325	3648001	7879	64 43 46.8	44.4	0.40	057651
25.5	4249819	9937	8440975	0969	3662597	2474	65 12 33.2	30.7	0.46	058024
26.0	4173290	3143	8474022	4016	3676933	6310	65 41 19.4	16.8	0.51	058394
26.5	4095923	6050	8506471	6464	3691011	0887	66 10 5.3	2.6	0.55	058761
27.0	4018533	8664	8538320	8312	3704829	4705	66 38 51.0	48.2	0.59	059125
27.5	3940855	0900	8569565	9557	3718385	8260	67 7 36.5	33.6	0.62	059485
28.0	3862894	3034	8600204	0196	3731677	1552	67 36 21.9	18.9	0.65	059842
28.5	3784655	4799	8630235	0226	3744707	4581	68 5 7.0	3.9	0.66	060195
29.0	3706144	6292	8659655	9646	3757473	7347	68 33 51.9	48.7	0.67	060544
29.5	3627367	7519	8688464	8455	3769973	9846	69 2 36.7	33.4	0.68	060899
30.0	3548328	8485	8716657	6648	3782205	2078	69 31 21.3	17.9	0.68	061230
30.5	3469034	9195	8744232	4223	3794170	4042	70 0 5.7	2.3	0.67	061566
31.0	3389490	9655	8771187	1178	3805867	5739	70 28 49.9	46.4	0.65	061897
31.5	3309792	9872	8797321	7512	3817294	7166	70 57 33.9	31.3	0.62	062223
June 1.0	+3229675	9850	+8823230	3221	+3823451	8323	71 26 17.7	14.0	-0.59	062545
										062861

NOTE.—The accented letters correspond to the mean equinox and equator of January 0d.0.

# SUN'S COÖRDINATES, 1872. 395

Date.	RECTANGULAR EQUATORIAL.						POLAR ECLIPTIC.			
1872.	X.	X'.	Y.	Y'.	Z.	Z'.	$\lambda = \odot$ 's True Longitude.	$\lambda'$	$\beta = \odot$ 's Latitude.	Log. Rad. Vect. = $\rho$ .
June 1.5	+3149416	9595	+8848312	8303	+3839336	9207	71° 54' 61.4	57.7	-0.55	0.0
2.0	3068931	9115	8872766	2758	3849949	9620	72 23 44.9	41.1	0.50	063172
2.5	2968225	8414	8896590	6582	3860290	0161	72 52 28.1	24.2	0.45	063777
3.0	2907303	7497	8919781	9773	3870356	0227	73 21 11.2	7.2	0.40	064071
3.5	2826172	6370	8942338	2330	3880147	0018	73 49 54.1	50.0	0.34	064359
4.0	2744840	5043	8964259	4252	3889663	9534	74 18 36.8	32.6	0.28	064641
4.5	2663311	3519	8985543	5536	3898902	8773	74 47 19.3	15.0	0.22	064917
5.0	2581591	1804	9006188	6182	3907664	7735	75 15 61.6	57.2	0.15	065187
5.5	2499687	9904	9026192	6187	3916547	6418	75 44 43.7	39.2	0.08	065450
6.0	2417605	7827	9045555	5551	3924952	4823	76 13 25.6	21.0	-0.01	065707
6.5	2335351	5578	9064274	4271	3933079	2950	76 42 7.3	2.6	+0.05	065958
7.0	2252930	3162	9082349	2346	3940925	0796	77 10 48.9	44.1	0.11	066203
7.5	2170350	0586	9099779	9777	3948491	8362	77 39 30.2	25.3	0.17	066442
8.0	2087618	7859	9116563	6562	3955776	5647	78 8 11.3	6.3	0.22	066675
8.5	2004740	4985	9132691	2639	3962780	2651	78 36 52.2	47.1	0.27	066931
9.0	1921722	1973	9148186	8188	3969502	9374	79 5 32.8	27.6	0.32	067121
9.5	1838570	8825	9163025	3028	3975943	5815	79 34 13.2	8.0	0.36	067336
10.0	1755291	5551	9177214	7218	3982102	1975	80 2 53.4	48.1	0.39	067545
10.5	1671890	2155	9190751	0756	3987977	7850	80 31 33.4	28.0	0.41	067748
11.0	1588374	8644	9203637	3644	3993569	3443	81 0 13.1	7.6	0.43	067945
11.5	1504750	5025	9215871	5879	3998878	8752	81 28 52.6	47.1	0.44	068137
12.0	1421024	1304	9227454	7464	4003004	3779	81 57 31.8	26.2	0.44	068323
12.5	1337201	7486	9238384	8396	4008647	8522	82 26 10.8	5.1	0.44	068504
13.0	1253287	3577	9248661	8675	4013105	2981	82 54 49.7	43.9	0.43	068681
13.5	1169289	9584	9258285	8301	4017280	7156	83 23 28.3	22.4	0.41	068853
14.0	1085213	5513	9267257	7275	4021172	1049	83 52 6.7	0.7	0.39	069020
14.5	1001065	1370	9275575	5595	4024779	4656	84 20 44.9	38.8	0.35	069182
15.0	0916850	7159	9283239	3261	4028102	7980	84 49 22.8	16.6	0.32	069339
15.5	0832574	2888	9290251	0275	4031142	1020	85 17 60.6	54.3	0.28	069492
16.0	0748243	8562	9296610	6636	4033899	3778	85 46 38.2	31.8	0.23	069642
16.5	0663862	4185	9302315	2343	4036372	6252	86 15 15.6	9.1	0.18	069787
17.0	0579437	9764	9307366	7397	4038560	8441	86 43 52.8	46.2	0.12	069928
17.5	0494974	5306	9311764	1797	4040465	0347	87 12 29.9	23.2	+0.06	070066
18.0	0410478	0815	9315509	5544	4042087	1970	87 41 6.8	0.0	-0.01	070230
18.5	0325956	6298	9318601	8639	4043425	3311	88 9 43.5	36.6	0.07	070330
19.0	0241412	1758	9321039	1080	4044480	4365	88 38 20.2	13.2	0.14	070456
19.5	0156853	7204	9322823	2866	4045251	5137	89 6 56.8	49.8	0.21	070573
20.0	+0072283	2639	9323364	4000	4045739	5636	89 35 33.2	26.1	0.28	070697
20.5	-0012292	1932	9324432	4481	4045944	5832	90 4 9.5	2.3	0.35	070813
21.0	0096867	6503	9324257	4309	4045865	5754	90 32 45.7	38.4	0.41	070925
21.5	0181435	1066	9323429	3484	4045503	5393	91 1 21.9	14.5	0.47	071033
22.0	0265992	5618	9321947	2005	4044858	4749	91 29 58.0	50.5	0.52	071138
22.5	0350531	0153	9319812	9873	4043930	3822	91 58 34.0	26.4	0.57	071239
23.0	0435047	4665	9317024	7088	4042718	2612	92 27 10.0	2.3	0.61	071337
23.5	0519534	9147	9313583	3650	4041224	1119	92 55 46.0	38.2	0.64	071431
24.0	0603988	3597	9309489	9559	4039446	9342	93 24 21.9	14.0	0.67	071521
24.5	0688402	8007	9304742	4816	4037385	7282	93 52 57.8	49.8	0.69	071617
25.0	0772770	2371	9299342	9421	4035041	4940	94 21 33.7	25.6	0.70	071639
25.5	0857087	6683	9293290	3371	4032414	2314	94 50 9.6	1.4	0.70	071766
26.0	0941347	0939	9286584	6668	4029504	9405	95 18 45.5	37.2	0.70	071839
26.5	1025545	5133	9279225	9313	4026312	6215	95 47 21.4	13.0	0.69	071938
27.0	1109673	9257	9271214	1306	4022837	2742	96 15 57.4	48.9	0.67	071972
27.5	1193728	3308	9262550	2645	4019079	8985	96 44 33.4	24.8	0.64	072031
28.0	1277703	7279	9253233	3332	4015039	4946	97 13 9.4	0.7	0.61	072055
28.5	1361582	1164	9243264	3367	4010716	0625	97 41 45.5	36.7	0.57	072134
29.0	1445390	4958	9232642	2749	4006110	6021	98 10 21.6	12.7	0.53	072177
29.5	1529089	8653	9221370	1481	4001221	1133	98 38 57.8	48.8	0.48	072215
30.0	1612684	2244	9209447	9562	3996051	5964	99 7 34.0	24.9	0.43	072247
30.5	1696168	5724	9196874	6993	3990599	0514	99 36 10.2	1.0	0.37	072274
July 1.0	1779536	9089	9183651	3775	3984864	4781	100 4 46.5	37.2	0.31	072295
1.5	1862781	2330	+9169778	9906	+3978848	8766	100 33 22.8	13.4	-0.25	072339

NOTE.—+ denotes a change in the preceding figure.

# 336 SUN'S COÖRDINATES, 1872.

RECTANGULAR EQUATORIAL.							POLAR ECLIPTIC.			
Date.	X.	X'.	Y.	Y'.	Z.	Z'.	$\lambda = \odot$ 's True Longitude.	$\lambda'$	$\beta = \odot$ 's Latitude.	Log. Rad. Vect. = $\rho$ .
1872.										0 0
July 2.0	—1945896	5441	+9155256	5388	+3972551	2471	101° 1' 59.2	49.7	—0.18	072317
2.5	2028377	8418	.9140087	0223	.3965973	5895	101 30 35.6	26.0	0.11	072319
3.0	2111717	1255	.9124271	4412	.3959115	9039	101 59 12.1	2.4	—0.04	072315
3.5	2194409	3943	.9107809	7954	.3951976	1901	102 27 48.6	38.8	+0.03	072314
4.0	2276948	6479	.9090703	0853	.3944557	4484	102 56 25.2	15.3	0.09	072286
4.5	2359327	8855	.9072954	3108	.3936859	6788	103 24 61.8	51.8	0.15	072262
5.0	2441540	1065	.9054562	4721	.3928882	8813	103 53 38.5	28.4	0.21	072231
5.5	2523580	3101	.9035529	5692	.3920626	0559	104 22 15.2	5.0	0.26	072194
6.0	2605442	4960	.9015857	6025	.3912093	2028	104 50 51.9	41.6	0.31	072150
6.5	2687119	6634	.8995547	5720	.3903283	3220	105 19 28.7	18.3	0.35	072100
7.0	2768605	8117	.8974600	4778	.3894196	4135	105 47 65.5	55.1	0.39	072043
7.5	2849893	9402	.8953019	3202	.3884833	4774	106 16 42.3	31.8	0.42	071980
8.0	2930978	0484	.8930806	0994	.3875196	5139	106 45 19.1	8.6	0.45	071910
8.5	3011854	1357	.8907961	8154	.3865285	5230	107 13 55.9	45.3	0.46	071834
9.0	3092513	2013	.8884485	4683	.3855099	5046	107 42 32.7	22.0	0.47	071751
9.5	3172951	2448	.8860382	0585	.3844642	4591	108 10 69.5	58.7	0.47	071662
10.0	3253162	2656	.8835655	5863	.3833913	3864	108 39 46.3	35.4	0.46	071567
10.5	3333139	2630	.8810306	0519	.3822913	2866	109 8 23.1	12.1	0.44	071467
11.0	3412876	2365	.8784337	4555	.3811643	1599	109 36 63.0	48.9	0.42	071361
11.5	3492370	1866	.8757749	7972	.3800105	0063	110 5 36.9	25.7	0.39	071250
12.0	3571614	1098	.8730545	0773	.3788300	8260	110 34 13.8	2.5	0.35	071133
12.5	3650601	0083	.8702726	2059	.3776228	6190	111 2 50.6	39.2	0.31	071010
13.0	3729327	8807	.8674294	4533	.3763890	3855	111 31 27.4	15.9	0.27	070882
13.5	3807787	7264	.8645254	5498	.3751287	1254	111 59 64.3	52.7	0.22	070750
14.0	3885976	5451	.8615608	5858	.3738421	8390	112 28 41.2	29.5	0.17	070613
14.5	3963888	3361	.8585357	5612	.3725292	5263	112 57 18.2	6.4	0.11	070471
15.0	4041519	0990	.8554503	4764	.3711901	1875	113 25 55.2	43.4	+0.05	070325
15.5	4118862	8331	.8523049	3315	.3698249	8225	113 54 32.3	2.4	—0.02	070174
16.0	4195913	5389	.8490998	1270	.3684339	4318	114 22 60.4	57.4	0.09	070019
16.5	4272667	2132	.8458352	8630	.3670171	0152	114 51 46.6	34.5	0.16	069869
17.0	4349120	8584	.8425113	5397	.3655745	5729	115 20 23.8	11.7	0.22	069696
17.5	4425264	4726	.8391285	1574	.3641063	1049	115 48 61.1	48.9	0.29	069532
18.0	4501096	0556	.8356869	7164	.3626126	6115	116 17 38.5	26.2	0.35	069363
18.5	4576611	6369	.8321866	2167	.3610935	0926	116 46 16.0	3.6	0.41	069190
19.0	4651805	1262	.8286278	6585	.3595492	5486	117 14 53.7	41.3	0.46	069014
19.5	4726671	6127	.8250111	0423	.3579796	9792	117 43 31.5	19.0	0.51	068834
20.0	4801205	0660	.8213366	3684	.3563850	3849	118 11 69.4	56.8	0.55	068654
20.5	4875402	4856	.8176945	6369	.3547655	7657	118 40 47.4	34.7	0.59	068464
21.0	4949258	8711	.8138150	8480	.3531211	1216	119 9 25.6	12.8	0.62	068271
21.5	5022767	2219	.8099683	0019	.3514518	4525	119 37 64.0	51.1	0.64	068080
22.0	5095925	5376	.8060647	0989	.3497580	7590	120 6 42.6	29.6	0.66	067883
22.5	5168726	8176	.8021043	1391	.3480396	0409	120 35 21.3	8.2	0.67	067682
23.0	5241166	0616	.7980875	1229	.3462967	2983	121 3 60.2	47.1	0.67	067478
23.5	5313239	2688	.7940145	0505	.3445294	5312	121 32 39.4	26.2	0.66	067271
24.0	5384942	4390	.7898854	9220	.3427379	7400	122 1 18.8	5.5	0.65	067061
24.5	5456269	5717	.7857006	7378	.3409222	9246	122 29 58.4	45.0	0.63	066845
25.0	5527215	6663	.7814602	4981	.3390825	0852	122 58 38.3	24.9	0.60	066626
25.5	5597773	7220	.7771647	2032	.3372188	2218	123 27 18.5	5.0	0.56	066402
26.0	5667940	7387	.7728141	8532	.3353314	3347	123 55 58.9	45.3	0.52	066174
26.5	5737711	7158	.7684087	4484	.3334202	4238	124 24 39.5	25.6	0.47	065943
27.0	5807080	6527	.7639489	9893	.3314853	4892	124 53 20.4	6.7	0.42	065707
27.5	5876041	5488	.7594349	4759	.3295269	5311	125 21 61.5	47.7	0.36	065467
28.0	5944589	4036	.7548670	9086	.3275452	5497	125 50 42.9	29.0	0.30	065222
28.5	6012719	2166	.7502454	2876	.3255402	5450	126 19 24.6	10.6	0.24	064971
29.0	6080426	9874	.7455704	6133	.3235120	5171	126 47 66.6	52.6	0.17	064715
29.5	6147705	7153	.7408424	8859	.3214608	4662	127 16 48.9	34.8	0.10	064454
30.0	6214551	4000	.7360617	1058	.3193868	3925	127 45 31.4	17.2	—0.03	064188
30.5	6280958	0408	.7312285	2732	.3172900	2960	128 14 14.2	0.0	+0.04	063916
31.0	6346921	6372	.7263431	3884	.3151706	1769	128 42 57.3	43.0	0.11	063639
31.5	6412435	1887	.7214059	4518	.3130287	0353	129 11 40.7	26.3	0.17	063356
Aug. 1.0	—6477495	6948	+7164173	4638	+3103645	8714	129 40 24.3	9.8	+0.23	063068

NOTE.—The accented letters correspond to the mean equinox and equator of January 0d.0.

# SUN'S COÖRDINATES, 1872. 397

Date.	RECTANGULAR EQUATORIAL.						POLAR ECLIPTIC.			
	X.	X'.	Y.	Y'.	Z.	Z'.	$\lambda = \odot$ 's True Longitude.	$\lambda'$	$\beta = \odot$ 's Latitude.	Log. Rad. Vect. = $\rho$ .
1872.										0.0
Aug. 1.5	—6542096	1550	+7113777	4248	+3086781	6853	130° 8' 68.2	53.7	+0.29	062774
2.0	.6660232	5687	.7063872	3350	.3064696	4771	130 37 52.5	37.9	0.34	062474
2.5	.6669899	9355	.7011463	1947	.3042392	2470	131 6 37.0	22.3	0.38	062168
3.0	.6733091	2548	.6959555	0045	.3019870	9951	131 35 21.7	6.9	0.42	061857
3.5	.6795804	5263	.6907150	7646	.2997133	7217	132 3 66.7	51.8	0.45	061539
4.0	.6858032	7493	.6854252	4754	.2974182	4270	132 32 52.0	37.1	0.48	061215
4.5	.6919771	9233	.6800866	1374	.2951019	1110	133 1 37.5	22.5	0.50	060885
5.0	.6981016	0480	.6746906	7510	.2927645	7739	133 30 23.2	8.1	0.52	060549
5.5	.7041762	1228	.6692646	3166	.2904062	4159	133 58 69.2	54.0	0.52	060208
6.0	.7102005	1473	.6637818	8345	.2880273	0374	134 27 55.5	40.3	0.52	059861
6.5	.7161739	1209	.6582519	3052	.2856278	6382	134 56 42.0	26.7	0.51	059508
7.0	.7220369	0432	.6526752	7291	.2832080	2187	135 25 28.8	13.4	0.49	059150
7.5	.7279665	9139	.6470521	1066	.2807680	7790	135 54 15.7	0.2	0.47	058786
8.0	.7337848	7324	.6413831	4382	.2783060	3194	136 22 62.8	47.3	0.44	058414
8.5	.7395505	4983	.6356666	7243	.2758282	8399	136 51 50.2	34.6	0.40	058043
9.0	.7452633	2113	.6299090	9653	.2733288	3408	137 20 37.8	22.1	0.36	057663
9.5	.7509227	8709	.6241047	1616	.2708099	8222	137 49 25.7	9.9	0.31	057279
10.0	.7565283	4768	.6182562	3137	.2682718	2845	138 17 73.8	58.0	0.26	056890
10.5	.7620798	0285	.6123639	4220	.2657148	7278	138 46 62.2	46.3	0.20	056497
11.0	.7675768	5258	.6064292	4869	.2631390	1524	139 15 50.8	34.8	0.13	056099
11.5	.7730189	9682	.6004497	5090	.2605446	5583	139 44 39.6	23.5	+0.06	055697
12.0	.7784057	3553	.5944287	4886	.2579317	9458	140 13 28.6	12.5	0.00	055291
12.5	.7837370	6869	.5883658	4263	.2553006	3150	140 42 17.9	1.7	—0.06	054882
13.0	.7890123	9625	.5822613	3224	.2526515	6663	141 10 67.5	51.2	0.13	054469
13.5	.7942313	1818	.5761157	1774	.2499846	9997	141 39 57.3	41.0	0.19	054053
14.0	.7993935	3444	.5699294	9916	.2473000	3154	142 8 47.3	30.9	0.25	053633
14.5	.8044988	4500	.5637030	7658	.2445979	6136	142 37 37.6	21.1	0.31	053211
15.0	.8095469	4984	.5573467	5001	.2418786	8947	143 6 28.2	11.6	0.37	052786
15.5	.8145373	4892	.5511310	1950	.2391423	1587	143 35 19.1	2.5	0.42	052358
16.0	.8194696	4219	.5447863	8508	.2363890	4058	144 3 70.2	53.6	0.47	051928
16.5	.8243437	2964	.5384030	4681	.2336190	6361	144 32 61.7	45.0	0.51	051496
17.0	.8291591	1122	.5319817	0473	.2308325	8499	145 1 53.5	36.7	0.55	051061
17.5	.8339156	8691	.5255227	5889	.2280297	0474	145 30 45.6	28.8	0.57	050624
18.0	.8386128	5667	.5190264	0931	.2252107	2288	145 59 38.1	21.3	0.59	050184
18.5	.8432504	2047	.5124932	5605	.2223758	3942	146 28 31.0	14.2	0.59	049742
19.0	.8478281	7828	.5059235	9914	.2195252	5440	146 57 24.1	7.2	0.60	049298
19.5	.8523455	3006	.4993171	3862	.2166590	6781	147 26 17.6	0.6	0.60	048852
20.0	.8568022	7577	.4926765	7454	.2137773	7968	147 54 71.5	54.4	0.59	048403
20.5	.8611981	1540	.4860000	0695	.2108804	9002	148 23 65.8	48.8	0.57	047952
21.0	.8655388	4892	.4792887	3587	.2079655	9887	148 52 60.4	43.2	0.55	047499
21.5	.8698059	7628	.4725431	6136	.2050417	0622	149 21 55.5	38.2	0.52	047044
22.0	.8740170	9744	.4657636	8346	.2021002	1210	149 50 51.0	33.6	0.48	046587
22.5	.8781660	1238	.4589506	0221	.1991442	1653	150 19 47.0	29.5	0.43	046127
23.0	.8822525	2108	.4521046	1766	.1961739	1954	150 48 43.4	25.9	0.38	045665
23.5	.8862760	2348	.4452261	2986	.1931896	2114	151 17 40.1	22.5	0.32	045200
24.0	.8902362	1955	.4383154	3884	.1901913	2135	151 46 37.3	19.6	0.26	044732
24.5	.8941329	0927	.4313731	4466	.1871793	2018	152 15 34.9	17.1	0.19	044262
25.0	.8979658	9261	.4243937	4737	.1841538	1767	152 44 33.0	15.1	0.12	043789
25.5	.9017345	6953	.4173954	4699	.1811149	1381	153 13 31.6	13.7	—0.06	043313
26.0	.9054386	4000	.4103607	4357	.1780628	0863	153 42 30.7	12.8	0.00	042834
26.5	.9090779	0398	.4032963	3718	.1749978	0216	154 11 30.2	12.2	+0.07	042352
27.0	.9126521	6145	.3962026	2786	.1719201	9443	154 40 30.1	12.0	0.14	041867
27.5	.9161609	1238	.3890800	1565	.1688209	8544	155 9 30.6	12.6	0.20	041377
28.0	.9196035	5671	.3819291	0060	.1657273	7522	155 38 31.6	13.5	0.27	040883
28.5	.9229800	9441	.3747503	8277	.1626126	6378	156 7 33.0	14.8	0.33	040386
29.0	.9262901	2548	.3675443	6222	.1594861	5116	156 36 34.8	16.5	0.38	039885
29.5	.9295335	4988	.3603115	3898	.1563479	3738	157 5 37.2	18.8	0.43	039381
30.0	.9327097	6756	.3530523	1310	.1531982	2244	157 34 40.1	21.7	0.47	038873
30.5	.9358186	7851	.3457675	8467	.1500373	0639	158 3 43.4	24.9	0.51	038360
31.0	.9388599	8270	.3384575	5371	.1468654	8923	158 32 47.1	28.5	0.54	037843
31.5	.9418332	8009	.3311228	2028	.1436829	7101	159 1 51.3	32.7	+0.56	037322

NOTE: — denotes a change in the preceding figure.

# 398 SUN'S COÖRDINATES, 1872.

Date.	RECTANGULAR EQUATORIAL.						POLAR ECLIPTIC.			
	X.	X'.	Y.	Y'.	Z.	Z'.	$\lambda = \odot$ 's True Longitude.	$\lambda'$	$\beta = \odot$ 's Latitude.	Log. Rad. Vect. = $\rho$ .
1872.										0.0
Sept. 1.0	—9447381	7064	+3237640	8444	+1404899	5175	159 30 55.9	37.3	+0.58	036797
1.5	.9475746	5435	.3163816	4624	.1372866	3145	159 50 61.0	42.3	0.59	036267
2.0	.9503423	3118	.3089762	0574	.1340733	1016	160 28 66.5	47.7	0.59	035733
2.5	.9530410	0112	.3015484	6300	.1308503	8789	160 57 72.4	53.6	0.58	035195
3.0	.9556705	6414	.2940926	1806	.1276177	6466	161 27 18.8	0.0	0.57	034653
3.5	.9582306	2021	.2866276	7100	.1243758	4050	161 56 25.6	6.7	0.55	034106
4.0	.9607211	6932	.2791359	2187	.1211249	1545	162 25 32.8	13.9	0.59	033555
4.5	.9631417	1145	.2716240	7072	.1178652	8951	162 54 40.4	21.4	0.49	033000
5.0	.9654921	4656	.2640926	1761	.1145970	6272	163 23 48.5	29.5	0.45	032442
5.5	.9677722	7464	.2565424	6263	.1113206	3511	163 52 56.9	37.8	0.40	031880
6.0	.9699821	9570	.2489738	0581	.1080362	6671	164 21 65.7	46.5	0.35	031315
6.5	.9721215	0971	.2413872	4718	.1047440	7752	164 50 74.9	55.7	0.29	030746
7.0	.9741901	1664	.2337833	8682	.1014442	4757	165 20 24.6	5.5	0.23	030173
7.5	.9761878	1648	.2261628	2481	.0981372	1690	165 49 34.6	15.3	0.17	029597
8.0	.9781146	0923	.2185263	6120	.0948232	8554	166 18 45.0	25.7	0.10	029018
8.5	.9799702	9486	.2108742	9602	.0915025	5350	166 47 55.8	36.4	+0.03	028437
9.0	.9817545	7337	.2032071	2934	.0881752	2080	167 16 67.0	47.6	—0.03	027854
9.5	.9834674	4473	.1955256	6122	.0848417	8748	167 45 78.6	59.1	0.10	027269
10.0	.9851089	0895	.1878303	9172	.0815023	5356	168 15 30.6	11.0	0.16	026682
10.5	.9866788	6602	.1801216	2088	.0781570	1907	168 44 43.0	23.4	0.22	026091
11.0	.9881769	1591	.1724002	4877	.0748063	8403	169 13 55.7	36.1	0.27	025498
11.5	.9896033	5862	.1646666	7544	.0714503	4846	169 42 68.9	49.2	0.32	024906
12.0	.9909578	9414	.1569214	0095	.0680893	1239	170 12 22.5	2.7	0.37	024310
12.5	.9922403	2247	.1491651	2535	.0647235	7584	170 41 36.5	16.7	0.41	023713
13.0	.9934509	4361	.1413982	4869	.0613530	3982	171 10 50.9	31.1	0.45	023116
13.5	.9945894	5754	.1336214	7104	.0579783	0138	171 39 65.8	45.9	0.48	022518
14.0	.9956557	6425	.1258351	9244	.0545995	6353	172 9 21.1	1.1	0.51	021919
14.5	.9966496	6372	.1180399	1294	.0512169	2530	172 38 36.8	16.8	0.53	021320
15.0	.9975712	5566	.1102363	3260	.0478308	8672	173 7 52.8	32.8	0.54	020721
15.5	.9984204	4096	.1024249	5149	.0444412	4779	173 36 69.3	49.2	0.54	020121
16.0	.9991972	1872	.0946962	6964	.0410486	0856	174 6 26.3	6.2	0.53	019521
16.5	.9999015	8924	.0867808	8712	.0376531	6804	174 35 43.8	23.6	0.51	018921
17.0	1.0005332	5248	.0789491	0397	.0342549	2924	175 4 61.7	41.5	0.49	018322
17.5	1.0010922	0846	.0711117	2025	.0308542	8920	175 34 20.2	0.0	0.46	017722
18.0	1.0015784	5716	.0632691	3601	.0274513	4894	176 3 39.2	18.9	0.43	017122
18.5	1.0019919	9859	.0554217	5129	.0240464	0848	176 32 58.7	38.3	0.39	016522
19.0	1.0023325	3274	.0475700	6613	.0206397	6783	177 1 78.6	58.2	0.34	015922
19.5	1.0026001	5958	.0397147	8062	.0172314	2703	177 31 39.1	18.6	0.29	015322
20.0	1.0027946	7911	.0318564	9481	.0138218	8610	178 0 60.1	39.6	0.23	014722
20.5	1.0029160	9133	.0239955	0874	.0104112	4507	178 30 21.7	1.1	0.17	014122
21.0	1.0029642	9624	.0161325	2245	.0069997	0394	178 50 43.8	23.2	0.10	013522
21.5	1.0029392	9382	.0082631	3693	.0035875	6275	179 28 66.5	45.8	—0.03	012921
22.0	1.0028409	8408	+0.004029	4952	+0.001749	2151	179 58 29.7	8.9	+0.04	012320
22.5	1.0026692	6700	—0.074627	3703	—0.032377	1972	180 27 53.4	32.6	0.11	011719
23.0	1.0024240	4257	.0153281	2356	.0066502	6095	180 56 77.7	56.9	0.17	011118
23.5	1.0021054	1079	.0231927	1000	.0100624	0214	181 26 42.6	21.7	0.24	010516
24.0	1.0017134	7168	.0310559	0631	.0134741	4329	181 55 68.0	47.1	0.30	009914
24.5	1.0012477	2520	.0389172	8243	.0168850	8435	182 25 34.0	13.0	0.36	009310
25.0	1.0007083	7133	.0467760	6830	.0202948	2531	182 54 60.7	39.7	0.41	008705
25.5	1.0000952	1013	.0546317	5386	.0237033	6614	183 24 27.9	6.8	0.46	008100
26.0	.9994085	4155	.0624837	3905	.0271103	0682	183 53 55.6	34.5	0.50	008083
26.5	.9986481	6560	.0703314	2381	.0305155	4731	184 23 23.9	2.7	0.54	007485
27.0	.9978140	8228	.0781743	0810	.0339186	8760	184 52 52.9	31.7	0.57	006876
27.5	.9969061	9158	.0860118	0184	.0373193	2764	185 22 22.4	1.2	0.60	006565
28.0	.9959245	9351	.0938432	7497	.0407175	6744	185 51 52.4	31.8	0.62	006053
28.5	.9948692	8807	.1016679	5743	.0441127	0694	186 21 23.0	1.7	0.63	004440
29.0	.9937401	7525	.1094853	3917	.0475047	4612	186 50 54.1	32.7	0.63	003825
29.5	.9925373	5506	.1172947	2010	.0508933	8496	187 20 25.8	4.3	0.62	003208
30.0	.9912608	2750	.1250956	0019	.0542783	2344	187 49 58.0	36.5	0.61	002590
30.5	.9899107	9258	.1328874	7939	.0576593	6152	188 19 30.8	0.2	0.59	001969
Oct. 1.0	—9884871	5032	—1406694	5757	—0.010361	9918	188 48 64.1	42.5	+0.56	001346

NOTE.—The accented letters correspond to the mean equinox and equator of January 0d.0.

# SUN'S COÖRDINATES, 1872. 399

RECTANGULAR EQUATORIAL.							POLAR ECLIPTIC.			
Date.	X.	X'.	Y.	Y'.	Z.	Z'.	$\lambda = \odot$ 's True Longitude.	$\lambda'$	$\beta = \odot$ 's Latitude.	Log. Rad. Vect. = $\rho$ .
1872.										
Oct. 1.5	— .9869900	:0070	— .1484409	3471	— .0644084	3639	189 18 37.9	16.2	+0.53	0.0
2.0	.9854195	4374	.1562014	1076	.0677761	7314	189 47 72.2	50.5	0.49	0000'6
2.5	.9837757	7945	.1639503	8565	.0711388	0939	190 17 47.1	25.4	0.44	009468
3.0	.9820586	0784	.1716870	5932	.0744962	4511	190 47 22.5	0.7	0.39	008838
3.5	.9802684	2893	.1794107	3169	.0778479	8026	191 16 58.4	36.6	0.33	008207
4.0	.9784053	4270	.1871210	0272	.0811939	1484	191 46 34.7	12.8	0.27	007574
4.5	.9764692	4918	.1948171	7234	.0845338	4881	192 15 71.5	49.6	0.21	006940
5.0	.9744606	4842	.2024985	4049	.0878673	8214	192 45 48.8	26.8	0.14	006305
5.5	.9723795	4040	.2101646	0710	.0911941	1480	193 15 26.6	4.5	0.08	005670
6.0	.9702260	2514	.2178148	7212	.0945140	4677	193 44 64.8	42.6	+0.01	005033
6.5	.9680003	0267	.2254485	3550	.0978268	7803	194 14 43.5	21.3	—0.06	004395
7.0	.9657026	7300	.2330651	:9717	.1011321	0855	194 44 22.6	0.3	0.12	003756
7.5	.9633331	3614	.2406640	5706	.1044296	3829	195 13 62.1	39.8	0.18	003117
8.0	.9608920	9213	.2482447	1514	.1077192	6724	195 43 42.1	19.7	0.24	002478
8.5	.9583795	4098	.2558065	7133	.1110007	:9537	196 12 22.5	0.1	0.29	001840
9.0	.9557967	8270	.2633489	2558	.1142738	2266	196 42 63.5	41.0	0.34	001202
9.5	.9531405	1731	.2708714	7784	.1175382	4908	197 12 44.8	22.2	0.38	000565
10.0	.9504153	4485	.2783734	2805	.1207937	7462	197 42 26.6	4.0	0.42	000028
10.5	.9476191	6533	.2858542	7614	.1240400	:9924	198 11 68.8	46.1	0.45	999391
11.0	.9447526	7878	.2933133	2206	.1272769	2292	198 41 51.5	28.8	0.48	998656
11.5	.9418158	8519	.3007503	6577	.1305042	4564	199 11 34.6	11.8	0.50	998022
12.0	.9388091	8462	.3081648	0723	.1337216	6737	199 40 78.2	55.4	0.52	997390
12.5	.9357327	7708	.3155561	4638	.1369289	8809	200 10 62.2	39.3	0.53	996759
13.0	.9325867	6258	.3229236	8315	.1401258	0776	200 40 46.6	23.7	0.53	996130
13.5	.9293714	4115	.3302669	1749	.1433121	2638	201 10 31.5	8.5	0.52	995503
14.0	.9260871	1282	.3375855	4937	.1464877	4393	201 39 76.8	53.8	0.51	994878
14.5	.9227339	7760	.3448789	7873	.1496523	6038	202 9 62.6	39.5	0.48	994255
15.0	.9193121	3552	.3521466	0552	.1528056	7570	202 39 49.0	25.9	0.45	993635
15.5	.9158219	8660	.3593879	2967	.1559475	8988	203 9 35.9	12.7	0.41	993017
16.0	.9122636	3087	.3666024	5114	.1590778	0290	203 39 23.2	0.0	0.36	992402
16.5	.9086374	6835	.3737896	6988	.1621962	1473	204 8 71.0	47.7	0.31	991789
17.0	.9049435	9906	.3809480	8583	.1653024	2535	204 38 59.3	35.9	0.25	991179
17.5	.9011821	2302	.3880798	:9894	.1683963	3473	205 8 48.1	24.7	0.19	990572
18.0	.8973535	4026	.3951819	0917	.1714777	4286	205 38 37.4	13.9	0.12	989967
18.5	.8934578	5079	.4022546	1647	.1745463	4972	206 8 27.3	3.8	—0.06	989365
19.0	.8894953	5464	.4092974	2078	.1776019	5528	206 37 77.7	54.1	+0.01	988766
19.5	.8854662	5183	.4163097	2203	.1806443	5951	207 7 68.6	45.0	0.08	988170
20.0	.8813709	4240	.4232911	2020	.1836733	6240	207 37 60.0	36.3	0.15	987576
20.5	.8772095	2636	.4302411	1523	.1866887	6393	208 7 52.0	28.3	0.21	986985
21.0	.8729822	:0373	.4371591	0706	.1896902	6408	208 37 44.6	20.8	0.27	986397
21.5	.8686893	7454	.4440445	:9563	.1926776	6281	209 7 37.8	14.0	0.33	985811
22.0	.8643311	3882	.4508969	8090	.1956508	6012	209 37 31.5	7.6	0.38	985227
22.5	.8599078	9659	.4577158	6282	.1986094	5598	210 7 25.7	1.8	0.43	984645
23.0	.8554196	4788	.4645006	4133	.2015532	5036	210 36 80.5	56.5	0.47	984065
23.5	.8508668	9270	.4712507	1637	.2044820	4324	211 6 75.9	51.9	0.51	983487
24.0	.8462499	3111	.4779657	8790	.2073956	3460	211 36 71.8	47.7	0.54	982912
24.5	.8415689	6311	.4846450	5586	.2102937	2441	212 6 68.3	44.1	0.57	982339
25.0	.8368241	8873	.4912881	2020	.2131760	1264	212 36 65.3	41.0	0.59	981768
25.5	.8320160	0802	.4978942	8084	.2160424	:9928	213 6 62.9	38.6	0.60	981198
26.0	.8271447	2099	.5044620	3774	.2188927	8431	213 36 61.0	36.6	0.61	980629
26.5	.8222106	2768	.5109936	9085	.2217265	6769	214 6 59.6	35.1	0.61	980061
27.0	.8172140	2813	.5174858	4011	.2245436	4940	214 36 58.8	34.2	0.60	979495
27.5	.8121553	2236	.5239390	8546	.2273438	2942	215 6 58.5	33.9	0.58	978930
28.0	.8070348	1041	.5303527	2637	.2301270	0774	215 36 58.7	34.0	0.56	978366
28.5	.8018530	9233	.5367263	6427	.2328928	8432	216 6 59.5	34.8	0.53	977803
29.0	.7966101	6815	.5430594	:9762	.2356409	5914	216 36 60.9	36.1	0.49	977242
29.5	.7913065	3789	.5493513	2685	.2383712	3217	217 6 62.7	37.9	0.45	976681
30.0	.7859426	:0160	.5556016	5192	.2410835	0340	217 36 65.0	40.1	0.40	976121
30.5	.7805187	5931	.5618096	7276	.2437776	7282	218 6 67.8	42.8	0.35	975562
31.0	.7750352	1107	.5679749	8933	.2464531	4038	218 36 71.2	46.1	0.29	975004
31.5	— .7694927	5692	— .5740861	0157	— .2491098	0635	219 6 75.0	49.9	+0.23	974447

◆ The first figures of this and the following logarithms are 9.9.

# 400 SUN'S COÖRDINATES, 1872.

RECTANGULAR EQUATORIAL.							POLAR ECLIPTIC.				
Date.	X.	X'.	Y.	Y'.	Z.	Z'.	$\lambda = \odot$ 's True Longitude.	$\lambda'$	$\beta = \odot$ 's Latitude.	Log. Rad. Vect. = $\rho$ .	
1872.											
Nov. 1.0	—7638915	9690	—5801752	0944	—2517476	6984	219° 36' 79.3	54.1	+0.16	963891	
1.5	7582319	3104	5862092	1288	2543663	3172	220° 6' 84.0	58.7	0.10	963336	
2.0	7525145	5941	5921984	1185	2569654	9164	220° 37' 29.1	3.7	+0.03	962782	
2.5	7467399	8205	5981423	0628	2595449	4959	221° 7' 34.6	9.2	—0.03	962230	
3.0	7409085	9901	6040404	9614	2621045	0556	221° 37' 40.6	15.1	0.10	961679	
3.5	7350206	1032	6098922	8137	2646441	5953	222° 7' 46.9	21.3	0.17	961130	
4.0	7293768	1634	6156972	6192	2671633	1146	222° 37' 53.6	27.9	0.23	960582	
4.5	7230776	1622	6214551	3776	2696623	6134	223° 7' 60.8	35.1	0.29	960036	
5.0	7170235	1091	6271654	0884	2721400	0915	223° 37' 68.4	42.6	0.34	959492	
5.5	7109149	0015	6328276	7511	2745971	5487	224° 7' 76.3	50.4	0.39	958950	
6.0	7047523	8400	6384411	3652	2770332	9849	224° 37' 84.6	58.6	0.43	958411	
6.5	6985363	6250	6440057	9303	2794480	3908	225° 8' 33.3	7.3	0.46	957874	
7.0	6922673	3570	6495210	4461	2818413	7932	225° 38' 42.3	16.2	0.49	957339	
7.5	6859458	0365	6549865	9122	2842130	1650	226° 8' 51.7	25.5	0.51	956838	
8.0	6795723	6640	6604018	3281	2865628	5150	226° 38' 61.4	35.1	0.52	956280	
8.5	6731473	2400	6657666	6935	2888907	8430	227° 8' 71.5	45.2	0.53	955755	
9.0	6666714	7651	6710805	0080	2911965	1489	227° 38' 82.0	55.6	0.53	955234	
9.5	6601450	2397	6763430	2711	2934800	4326	228° 9' 32.8	6.3	0.52	954716	
10.0	6535686	6643	6815536	4823	2957409	6937	228° 39' 43.9	17.3	0.51	954232	
10.5	6469427	0394	6867123	6416	2979792	9321	229° 9' 55.4	28.8	0.49	953693	
11.0	6402677	3654	6918186	7485	3001948	1479	229° 39' 67.3	40.6	0.46	953188	
11.5	6335442	6429	6968720	8025	3023874	3407	230° 9' 79.5	52.7	0.42	952687	
12.0	6267727	8724	7018722	8034	3045569	5104	230° 40' 32.1	5.2	0.38	952191	
12.5	6199536	0543	7068188	7506	3067031	6568	231° 10' 45.1	18.2	0.33	951669	
13.0	6130875	1892	7117115	6439	3088259	7798	231° 40' 58.4	31.4	0.28	951212	
13.5	6061749	2776	7165500	4831	3109251	8792	232° 10' 72.1	45.0	0.23	950730	
14.0	5992161	3196	7213338	2676	3130005	9548	232° 40' 86.1	58.9	0.17	950253	
14.5	5922118	3165	7260626	9971	3150519	0064	233° 11' 40.5	13.3	0.11	949781	
15.0	5851625	2682	7307361	6712	3170793	0340	233° 41' 55.3	28.0	—0.04	949314	
15.5	5780685	1752	7353537	2896	3190826	0375	234° 11' 70.5	43.1	+0.03	948853	
16.0	5709304	0390	7399154	8520	3210616	0168	234° 41' 86.0	58.5	0.09	948397	
16.5	5637487	8573	7444207	3580	3230162	9716	235° 12' 42.0	14.5	0.16	947946	
17.0	5565239	6335	7488693	8073	3249462	9018	235° 42' 58.4	30.8	0.22	947501	
17.5	5492565	3670	7532637	1994	3268515	8074	236° 12' 75.2	47.5	0.28	947061	
18.0	5419470	0584	7575947	5342	3287318	6880	236° 43' 32.4	4.5	0.33	946627	
18.5	5345958	7082	7618709	8111	3305870	5434	237° 13' 50.0	22.1	0.39	946197	
19.0	5272036	3170	7660891	0300	3324171	3738	237° 43' 68.0	40.0	0.44	945772	
19.5	5197708	8851	7702487	1904	3342218	1787	238° 13' 86.4	58.3	0.48	945353	
20.0	5122979	4131	7743495	2920	3360008	9580	238° 44' 45.3	17.2	0.52	944939	
20.5	5047854	9016	7783910	3342	3377542	7116	239° 14' 64.6	36.5	0.55	944529	
21.0	4972338	3510	7823730	3170	3394819	4396	239° 44' 84.3	56.1	0.58	944124	
21.5	4896436	7617	7862951	2399	3411837	1417	240° 15' 44.4	16.1	0.59	943724	
22.0	4820154	1344	7901570	1026	3428594	8177	240° 45' 65.0	36.6	0.60	943328	
22.5	4743498	4698	7939582	9046	3445088	4674	241° 15' 86.0	57.5	0.59	942937	
23.0	4666473	7682	7976985	6457	3461318	0907	241° 46' 47.4	18.8	0.58	942550	
23.5	4589085	0303	8013776	3256	3477283	6875	242° 16' 69.2	40.5	0.56	942167	
24.0	4511340	2567	8049951	9440	3492981	2576	242° 47' 31.3	2.5	0.54	941788	
24.5	4433243	4479	8085506	5003	3508410	8008	243° 17' 53.9	25.0	0.51	941413	
25.0	4354801	6046	8120439	9945	3523570	3171	243° 47' 76.9	47.9	0.47	941042	
25.5	4276020	7274	8154745	4260	3538459	8063	244° 18' 40.3	11.2	0.43	940674	
26.0	4196904	8167	8188421	7945	3553074	2682	244° 48' 64.0	34.8	0.39	940310	
26.5	4117461	8733	8221465	0998	3567415	7026	245° 18' 88.1	58.9	0.34	939949	
27.0	4037697	8978	8253873	3415	3581480	1094	245° 49' 52.6	23.3	0.28	939592	
27.5	3957615	8908	8285643	5194	3595268	4885	246° 19' 77.4	48.0	0.22	939238	
28.0	3877230	8528	8316771	6331	3608777	8398	246° 50' 42.5	13.0	0.16	938886	
28.5	3796541	7848	8347254	6823	3622007	1631	247° 20' 67.9	38.4	0.09	938538	
29.0	3715556	6872	8377090	6663	3634957	4585	247° 51' 33.7	4.1	+0.02	938194	
29.5	3634282	5636	8406275	5862	3647625	7257	248° 21' 59.8	30.1	—0.05	937853	
30.0	3552725	4057	8434807	4404	3660009	9645	248° 51' 86.2	56.4	0.12	937515	
30.5	3470892	2233	8462634	2290	3672109	1748	249° 22' 52.9	23.0	0.19	937180	
Dec. 1.0	—3388791	0140	—8489904	9520	—3683924	3567	249° 52' 79.8	49.8	—0.25	936849	

NOTE.—The accented letters correspond to the mean equinox and equator of January 0d.0.

# SUN'S COÖRDINATES, 1872. 401

Date.	RECTANGULAR EQUATORIAL.						POLAR ECLIPTIC.				
	X.	X'.	Y.	Y'.	Z.	Z'.	$\lambda = \odot$ 's True Longitude.	$\lambda'$	$\beta = \odot$ 's Latitude.	Log. Rad. Vect. = $\rho$ .	
1872.											
Dec. 1.5	—3306427	7784	—8516464	6090	—3695452	5099	250° 23' 47.0	16.9	—0.31	9.9 936521	
2.0	3222307	5172	8542362	1908	3706692	6343	250 53 74.4	44.2	0.37	936196	
2.5	3140938	2311	8567596	7242	3717644	7289	251 24 42.0	11.7	0.42	935875	
3.0	3057828	9209	8592165	1821	3728307	7966	251 54 69.9	39.5	0.46	935557	
3.5	2974482	5871	8616066	5732	3738679	8344	252 25 38.0	7.5	0.50	935243	
4.0	2890907	2304	8639297	8974	3748760	8427	252 55 66.4	35.8	0.53	934933	
4.5	2807111	8516	8661857	1544	3758549	8220	253 26 34.9	4.2	0.56	934627	
5.0	2723101	4514	8683744	3441	3768046	7721	253 56 63.6	32.8	0.58	934325	
5.5	2638883	0304	8704956	4664	3777251	6930	254 27 32.5	1.6	0.59	934028	
6.0	2554464	5892	8725491	5210	3786162	5846	254 57 61.5	30.5	0.59	933735	
6.5	2469851	1287	8745348	5078	3794778	4466	255 27 90.7	59.7	0.58	933447	
7.0	2385051	6495	8764527	4268	3803099	2792	255 58 60.1	29.0	0.57	933163	
7.5	2300069	1520	8783026	2778	3811126	0823	256 28 89.6	58.4	0.55	932885	
8.0	2214913	6371	8800844	0607	3818857	8558	256 59 59.2	27.9	0.52	932612	
8.5	2129589	1054	8817979	7753	3826290	5995	257 29 89.0	57.7	0.49	932345	
9.0	2044105	5577	8834431	4216	3833427	3137	258 0 58.9	27.5	0.45	932083	
9.5	1958466	9945	8850199	9995	3840267	9981	258 30 89.0	57.5	0.41	931826	
10.0	1872679	4165	8865822	5090	3846810	6520	259 1 59.2	27.6	0.36	931576	
10.5	1786750	8243	8879679	9498	3853054	2777	259 31 89.5	57.8	0.31	931332	
11.0	1700686	2186	8893389	3219	3859001	8729	260 2 60.0	28.2	0.25	931094	
11.5	1614495	6001	8906411	6253	3864649	4382	260 32 90.6	58.7	0.19	930862	
12.0	1528181	9693	8918744	8598	3869997	9735	261 3 61.3	29.3	0.13	930637	
12.5	1441751	3270	8930388	9254	3875047	4790	261 34 32.2	0.1	—0.07	930419	
13.0	1355212	6737	8941342	1220	3879797	9545	262 4 63.3	31.1	0.00	930207	
13.5	1268570	0101	8951605	1495	3884247	4000	262 35 34.5	2.2	+0.07	930002	
14.0	1181832	3369	8961177	1079	3888397	8155	263 5 65.8	33.4	0.13	929804	
14.5	1095003	6546	8970056	9970	3892247	2010	263 36 37.2	4.7	0.19	929613	
15.0	1008089	9638	8978242	8168	3895797	5565	264 6 68.8	36.2	0.25	929428	
15.5	0921097	2652	8985735	5673	3899045	8818	264 37 40.6	7.9	0.30	929250	
16.0	0834032	5592	8992533	2484	3901991	1769	265 7 72.6	39.8	0.35	929080	
16.5	0746901	8467	8998635	8598	3904636	4419	265 38 44.7	11.9	0.39	928916	
17.0	0759710	1281	9004042	4017	3906980	6768	266 8 77.0	44.1	0.43	928759	
17.5	0572466	4042	9008753	8741	3909023	8816	266 39 49.5	16.5	0.46	928609	
18.0	0485176	6757	9012768	2769	3910763	0562	267 9 82.2	49.1	0.49	928466	
18.5	0397846	9432	9016084	6098	3912201	2005	267 40 55.0	21.8	0.51	928329	
19.0	0310481	2072	9018702	8729	3913336	3146	268 10 88.0	54.7	0.52	928199	
19.5	0223089	4685	9020620	0660	3914168	3983	268 41 61.2	27.8	0.52	928076	
20.0	0135675	7276	9021838	1891	3914696	4517	269 12 34.6	1.1	0.52	927958	
20.5	—0048248	9854	9022356	2422	3914922	4748	269 42 68.1	34.5	0.51	927846	
21.0	+0039187	7576	9022174	2253	3914844	4676	270 13 41.8	8.1	0.49	927740	
21.5	0126623	5008	9021290	1382	3914462	4299	270 43 75.7	41.9	0.46	927641	
22.0	0214054	2435	9019705	9811	3913775	3618	271 14 49.8	15.9	0.43	927548	
22.5	0301471	9848	9017418	7537	3912784	2632	271 44 84.0	50.0	0.39	927459	
23.0	0388869	7242	9014429	4561	3911489	1343	272 15 58.4	24.3	0.34	927376	
23.5	0476241	4610	9010737	0883	3909890	9750	272 45 92.9	58.7	0.29	927298	
24.0	0563579	1945	9006342	6502	3907988	7854	273 16 67.5	33.2	0.23	927226	
24.5	0650877	9239	9001245	1418	3905780	5651	273 47 42.3	7.9	0.17	927159	
25.0	0738128	6486	8995445	5632	3903268	3145	274 17 77.3	42.8	0.10	927096	
25.5	0825325	3680	8988944	9145	3900451	0334	274 48 52.4	17.8	+0.03	927037	
26.0	0912459	0811	8981740	1955	3897328	7217	275 18 87.5	52.8	—0.03	926983	
26.5	0999525	7874	8973834	4063	3893902	3797	275 49 62.7	28.0	0.08	926934	
27.0	1086516	4862	8965227	5470	3890172	0073	276 20 38.0	3.2	0.16	926890	
27.5	1173424	1767	8955919	6176	3886136	6043	276 50 73.5	38.6	0.23	926850	
28.0	1260241	8582	8945910	6181	3881795	1708	277 21 49.0	14.0	0.29	926814	
28.5	1346961	5299	8935201	5486	3877152	7071	277 51 84.6	49.5	0.35	926782	
29.0	1433576	1912	8923794	4093	3872205	2130	278 22 60.2	25.0	0.40	926755	
29.5	1520080	8414	8911688	2001	3866955	6886	278 53 35.8	0.5	0.46	926732	
30.0	1606465	4797	8898884	9112	3861402	1340	279 23 71.4	36.0	0.51	926712	
30.5	1692724	1054	8885385	5727	3855547	5491	279 54 47.0	11.5	0.55	926697	
31.0	1778850	7178	8871192	1548	3849390	9340	280 24 82.6	47.0	0.59	926686	
31.5	1864836	3162	8856305	6675	3842932	2888	280 55 58.2	22.5	0.62	926679	
32.0	+1950674	9999	—8840725	1110	—3836173	6136	281 25 93.8	58.1	—0.64	926677	

NOTE.—+ denotes a change in the preceding figure.



# 402 HELIOCENTRIC COÖRDINATES.

MERCURY.									
1872.	Julian Day.	$x$ .	$y$ .	$z$ .	Log Radius Vector.	Longitude in Orbit.	$-\frac{x}{r}$ .	$-\frac{y}{r}$ .	$-\frac{z}{r}$ .
	240								
Jan.	2 4790	+0.0909	+0.2934	+0.0167	9.4879	73° 15.6	-3.04	- 9.82	-0.56
	7 4795	-0.0757	0.3026	0.0323	9.4973	104 33.7	+2.37	9.48	1.01
	12 4800	0.2257	0.2414	0.0407	9.5239	133 17.5	5.87	6.30	1.06
	17 4805	0.3327	0.1326	0.0410	9.5579	158 11.7	6.87	2.73	0.84
	22 4810	0.3883	+0.0027	0.0350	9.5912	179 28.4	6.36	- 0.05	0.57
Feb.	27 4815	0.3957	-0.1285	0.0246	9.6198	197 54.2	5.33	+ 1.73	0.34
	2 4820	0.3627	0.2470	+0.0116	9.6421	214 17.2	4.18	2.85	-0.13
	7 4825	0.3064	0.3455	-0.0025	9.6577	229 17.9	3.09	3.56	+0.02
	12 4830	0.2098	0.4140	0.0162	9.6666	243 29.2	2.05	4.03	0.16
	17 4835	-0.1061	0.4535	0.0289	9.6690	257 18.4	+1.02	4.35	0.28
March	22 4840	+0.0057	0.4602	0.0394	9.6648	271 11.1	-0.06	4.54	0.39
	27 4845	0.1164	0.4325	0.0470	9.6542	285 32.7	1.23	4.59	0.50
	1 4850	0.2180	0.3698	0.0507	9.6368	300 51.9	2.61	4.43	0.61
	6 4855	0.2994	0.2740	0.0500	9.6128	317 43.3	4.23	3.87	0.70
	11 4860	0.3486	0.1496	0.0438	9.5827	336 49.7	6.05	2.60	0.76
April	16 4865	0.3518	-0.0059	0.0320	9.5486	359 0.6	7.74	+ 0.12	0.71
	21 4870	0.2971	+0.1386	-0.0149	9.5157	24 57.5	8.20	- 3.83	+0.41
	26 4875	0.1819	0.2528	+0.0051	9.4927	54 34.4	5.88	8.17	-0.16
	1 4880	+0.0236	0.3063	0.0238	9.4891	86 7.5	-0.79	10.16	0.79
	6 4885	-0.1406	0.2851	0.0368	9.5066	116 39.3	+4.13	8.39	1.08
May	11 4890	0.2750	0.2016	0.0417	9.5374	143 52.8	6.54	4.79	0.90
	16 4895	0.3614	+0.0812	0.0392	9.5718	167 14.2	6.77	- 1.52	0.73
	21 4900	0.3968	-0.0516	0.0312	9.6035	187 15.4	5.97	+ 0.77	0.47
	26 4905	0.3868	0.1787	0.0196	9.6297	204 45.8	4.86	2.25	0.25
	31 4910	0.3400	0.2893	+0.0060	9.6492	220 31.0	3.73	3.17	-0.07
June	6 4915	0.2646	0.3758	-0.0081	9.6621	235 8.0	2.66	3.77	+0.08
	11 4920	0.1690	0.4340	0.0216	9.6683	249 7.2	1.63	4.18	0.21
	16 4925	-0.0610	0.4603	0.0335	9.6681	262 54.8	+0.59	4.44	0.32
	21 4930	+0.0513	0.4531	0.0429	9.6613	276 56.0	-0.52	4.58	0.43
	26 4935	0.1594	0.4110	0.0490	9.6479	291 37.3	1.76	4.55	0.54
July	31 4940	0.2541	0.3347	0.0511	9.6278	307 29.3	3.23	4.26	0.65
	6 4945	0.3243	0.2262	0.0481	9.6012	325 10.0	4.96	3.47	0.74
	11 4950	0.3563	-0.0915	0.0397	9.5691	345 15.3	6.80	+ 1.75	0.76
	16 4955	0.3371	+0.0547	0.0257	9.5347	9 4.4	8.17	- 1.33	0.61
	21 4960	0.2571	0.1905	-0.0069	9.5046	36 36.1	7.67	5.67	+0.21
Aug.	26 4965	+0.1209	0.2832	+0.0131	9.4886	67 18.9	-4.02	9.41	-0.46
	31 4970	-0.0445	0.3066	0.0297	9.4940	98 49.0	+1.26	9.89	0.95
	6 4975	0.2003	0.2574	0.0397	9.5178	128 10.9	5.44	6.92	1.08
	11 4980	0.3165	0.1555	0.0415	9.5514	153 49.1	6.83	3.36	0.90
	16 4985	0.3816	+0.0278	0.0365	9.5853	175 43.5	6.51	- 0.48	0.63
Sept.	21 4990	0.3977	-0.1046	0.0268	9.6149	194 37.5	5.54	+ 1.43	0.37
	26 4995	0.3717	0.2261	0.0142	9.6384	211 25.2	4.40	2.68	-0.17
	31 5000	0.3122	0.3276	+0.0003	9.6552	226 33.7	3.28	3.44	0.00
	6 5005	0.2277	0.4030	-0.0137	9.6654	240 51.9	2.26	3.95	+0.13
	11 5010	0.1264	0.4485	0.0266	9.6690	254 43.4	1.21	4.29	0.25
Oct.	16 5015	-0.0155	0.4615	0.0377	9.6661	268 33.6	+0.16	4.51	0.37
	21 5020	+0.0962	0.4401	0.0458	9.6567	282 47.6	-1.00	4.60	0.48
	26 5025	0.2000	0.3842	0.0504	9.6406	297 53.5	2.33	4.48	0.59
	31 5030	0.2861	0.2944	0.0506	9.6178	314 24.7	3.91	4.02	0.69
	6 5035	0.3425	0.1742	0.0454	9.5887	333 2.2	5.71	2.92	0.76
Nov.	11 5040	0.3556	-0.0329	0.0346	9.5557	354 34.7	7.47	+ 0.69	0.73
	16 5045	+0.3120	+0.1129	-0.0184	9.5214	19 47.4	-8.20	- 2.97	+0.40

NOTE.—The Epoch is the 2405,000th day of the Julian Period = 1872, July 25.

# HELIOCENTRIC COÖRDINATES. 403

MERCURY.									
1872.	Julian Day.	$x$ .	$y$ .	$z$ .	Log Radius Vector.	Longitude in Orbit.	$-\frac{x^2}{r^2}$ .	$-\frac{y^2}{r^2}$ .	$-\frac{z^2}{r^2}$ .
	240								
Sept. 13	5050	+0.2075	+0.2353	+0.0013	9.4958	48° 47.7	- 6.59	- 7.44	-0.04
18	5055	+0.0549	0.3020	0.0207	9.4881	80 11.7	- 1.83	10.09	0.69
23	5060	-0.1112	0.2946	0.0349	9.5020	111 8.1	+ 3.37	8.94	1.06
28	5065	0.2533	0.2210	0.0414	9.5311	139 4.3	6.29	5.49	1.02
Oct. 3	5070	0.3493	+0.1053	0.0402	9.5654	163 7.9	6.84	- 2.06	0.78
8	5075	0.3937	-0.0265	0.0330	9.5960	183 43.0	6.17	+ 0.41	0.52
13	5080	0.3918	0.1557	0.0219	9.6252	201 38.0	5.08	2.02	0.29
18	5085	0.3510	0.2702	+0.0067	9.6461	217 39.9	3.94	3.03	-0.10
23	5090	0.2805	0.3617	-0.0055	9.6602	232 27.2	2.85	3.68	+0.06
28	5095	0.1881	0.4253	0.0192	9.6677	246 31.4	1.83	4.11	0.18
Nov. 2	5100	-0.0820	0.4578	0.0314	9.6686	260 19.3	+ 0.79	4.40	0.30
7	5105	+0.0300	0.4570	0.0414	9.6631	274 16.0	- 0.30	4.57	0.41
12	5110	0.1396	0.4218	0.0481	9.6509	288 47.6	1.52	4.57	0.52
17	5115	0.2379	0.3517	0.0510	9.6321	304 23.8	2.94	4.34	0.63
22	5120	0.3134	0.2490	0.0491	9.6067	321 40.8	4.62	3.67	0.72
27	5125	0.3537	-0.1187	0.0417	9.5755	341 22.2	6.46	+ 2.18	0.76
Dec. 2	5130	0.3466	+0.0271	0.0287	9.5411	4 20.7	8.00	- 0.64	0.67
7	5135	0.2769	0.1671	-0.0106	9.5095	31 9.0	7.97	4.85	+0.30
12	5140	+0.1498	0.2705	+0.0095	9.4901	61 24.0	- 4.94	8.91	-0.31
17	5145	-0.0132	0.3080	0.0272	9.4913	92 59.4	+ 0.42	10.07	0.89
22	5150	0.1736	0.2714	0.0385	9.5125	122 55.8	4.90	7.66	1.09
27	5155	0.2984	0.1774	0.0417	9.5449	149 18.3	6.74	3.99	0.94
32	5160	0.3734	+0.0524	0.0379	9.5791	171 52.0	6.65	- 0.94	0.68
37	5165	-0.3981	-0.0817	+0.0288	9.6097	191 28.8	+ 5.73	+ 1.17	-0.41
VENUS.									
1872.	Julian Day.	$x$ .	$y$ .	$z$ .	Log Radius Vector.	Longitude in Orbit.	$-\frac{x^2}{r^2}$ .	$-\frac{y^2}{r^2}$ .	$-\frac{z^2}{r^2}$ .
	210								
Jan. 2	4790	-0.6406	+0.3234	+0.0416	9.8566	153° 14.2	+20.94	-10.57	-1.36
7	4795	0.6801	0.2296	0.0424	9.8568	161 20.7	22.20	7.50	1.39
12	4800	0.7062	0.1315	0.0425	9.8570	169 26.7	23.01	4.28	1.38
17	4805	0.7181	+0.0307	0.0417	9.8573	177 32.1	23.35	- 1.00	1.35
22	4810	0.7159	-0.0707	0.0400	9.8576	185 36.9	23.24	+ 2.29	1.30
27	4815	0.6996	0.1708	0.0376	9.8580	193 40.8	22.66	5.53	1.22
Feb. 1	4820	0.6695	0.2674	0.0345	9.8584	201 44.0	21.62	6.63	1.11
6	4825	0.6262	0.3589	0.0307	9.8588	209 46.3	20.16	11.55	0.99
11	4830	0.5707	0.4432	0.0262	9.8592	217 47.6	18.32	14.23	0.84
16	4835	0.5040	0.5190	0.0212	9.8596	225 48.1	16.14	16.62	0.68
21	4840	0.4275	0.5846	0.0158	9.8600	233 47.6	13.65	18.66	0.50
26	4845	0.3427	0.6390	0.0102	9.8604	241 46.3	10.91	20.34	0.33
March 1	4850	0.2512	0.6808	+0.0044	9.8608	249 44.1	7.98	21.62	-0.14
6	4855	0.1550	0.7096	-0.0016	9.8611	257 41.2	4.91	22.49	+0.05
11	4860	-0.0557	0.7247	0.0076	9.8614	265 37.5	+ 1.76	22.92	0.24
16	4865	+0.0447	0.7257	0.0133	9.8617	273 33.2	- 1.41	22.90	0.42
21	4870	0.1442	0.7128	0.0188	9.8619	281 26.4	4.54	22.46	0.59
26	4875	0.2409	0.6864	0.0240	9.8621	289 23.2	7.58	21.60	0.76
31	4880	0.3330	0.6468	0.0287	9.8622	297 17.6	10.47	20.33	0.90
April 1	4885	0.4188	0.5949	0.0328	9.8623	305 11.9	18.16	18.69	1.03
6	4890	0.4965	0.5316	0.0363	9.8623	313 6.0	15.61	16.71	1.14
11	4895	0.5648	0.4581	0.0392	9.8622	321 0.2	17.76	14.41	1.23
16	4900	+0.6222	-0.3757	-0.0413	9.8621	328 54.6	-19.57	+11.81	-1.30

NOTE.—The Epoch is the 2405,000th day of the Julian Period = 1872, July 25.

# 404 HELIOCENTRIC COÖRDINATES.

VENUS.									
1872.	Julian Day.	$x$ .	$y$ .	$z$ .	Log Radius Vector.	Longitude in Orbit.	$-\frac{x^2}{r^3}$ .	$-\frac{y^2}{r^3}$ .	$-\frac{z^2}{r^3}$ .
	240								
April 21	4905	+0.6677	-0.2861	-0.0426	9.8620	336° 49.3	-21.03	+ 9.01	+1.34
26	4910	0.7005	0.1911	0.0430	9.8618	344 44.4	22.10	6.03	1.25
May 1	4915	0.7197	-0.0924	0.0427	9.8615	352 40.0	22.74	+ 2.92	1.35
6	4920	0.7252	+0.0079	0.0415	9.8612	0 36.2	22.96	- 0.25	1.32
11	4925	0.7167	0.1081	0.0395	9.8609	8 33.1	22.75	3.43	1.26
16	4930	0.6943	0.2061	0.0368	9.8605	16 30.8	22.10	6.56	1.17
21	4935	0.6585	0.3004	0.0334	9.8601	24 29.3	21.01	9.59	1.07
26	4940	0.6099	0.3889	0.0293	9.8597	32 28.7	19.51	12.45	0.93
31	4945	0.5494	0.4697	0.0246	9.8593	40 29.0	17.63	15.08	0.79
June 5	4950	0.4781	0.5413	0.0194	9.8589	48 30.1	15.38	17.42	0.63
10	4955	0.3977	0.6023	0.0139	9.8585	56 32.2	12.83	19.44	0.45
15	4960	0.3093	0.6515	0.0081	9.8581	64 35.2	10.01	21.08	0.26
20	4965	0.2148	0.6879	-0.0022	9.8577	72 39.0	6.97	22.31	+0.07
25	4970	0.1162	0.7106	+0.0038	9.8574	80 43.6	3.78	23.11	-0.12
30	4975	+0.0152	0.7194	0.0098	9.8571	88 48.9	- 0.50	23.43	0.32
July 5	4980	-0.0861	0.7138	0.0155	9.8568	96 54.8	+ 2.81	23.30	0.50
10	4985	0.1857	0.6942	0.0209	9.8566	105 1.2	6.06	22.69	0.68
15	4990	0.2816	0.6607	0.0259	9.8565	113 8.0	9.20	21.61	0.85
20	4995	0.3719	0.6141	0.0304	9.8564	121 15.1	12.16	20.10	1.00
25	5000	0.4547	0.5552	0.0342	9.8564	129 22.3	14.88	18.18	1.12
30	5005	0.5286	0.4852	0.0375	9.8564	137 29.5	17.30	15.88	1.23
Aug. 4	5010	0.5919	0.4056	0.0399	9.8565	145 36.6	19.36	13.26	1.31
9	5015	0.6434	0.3180	0.0416	9.8566	153 43.4	21.03	10.39	1.36
14	5020	0.6821	0.2240	0.0425	9.8568	161 49.9	22.26	7.31	1.39
19	5025	0.7073	0.1255	0.0425	9.8571	169 55.9	23.04	4.09	1.38
24	5030	0.7184	+0.0246	0.0416	9.8574	178 1.2	23.36	- 0.80	1.35
29	5035	0.7154	-0.0768	0.0399	9.8577	186 5.9	23.21	+ 2.50	1.29
Sept. 3	5040	0.6982	0.1767	0.0375	9.8580	194 9.8	22.60	5.73	1.21
8	5045	0.6673	0.2732	0.0343	9.8584	202 12.9	21.55	8.82	1.11
13	5050	0.6232	0.3642	0.0304	9.8588	210 15.1	20.06	11.72	0.98
18	5055	0.5670	0.4481	0.0259	9.8592	218 16.4	18.20	14.38	0.83
23	5060	0.4997	0.5233	0.0210	9.8596	226 16.8	16.00	16.75	0.68
28	5065	0.4227	0.5883	0.0156	9.8600	234 16.3	13.49	18.78	0.50
Oct. 3	5070	0.3374	0.6419	0.0099	9.8604	242 14.9	10.73	20.43	0.31
8	5075	0.2456	0.6831	+0.0040	9.8608	250 12.7	7.79	21.69	-0.13
13	5080	0.1491	0.7110	-0.0020	9.8612	258 9.7	4.72	22.53	+0.06
18	5085	-0.0497	0.7251	0.0079	9.8615	266 6.0	+ 1.57	22.93	0.25
23	5090	+0.0506	0.7253	0.0136	9.8617	274 1.7	- 1.60	22.89	0.43
28	5095	0.1501	0.7117	0.0191	9.8619	281 56.8	4.73	22.43	0.63
Nov. 2	5100	0.2466	0.6845	0.0243	9.8621	289 51.5	7.76	21.54	0.76
7	5105	0.3384	0.6440	0.0290	9.8622	297 46.0	10.63	20.25	0.91
12	5110	0.4237	0.5913	0.0331	9.8623	305 40.2	13.31	18.59	1.04
17	5115	0.5009	0.5273	0.0366	9.8623	313 34.4	15.74	16.58	1.15
22	5120	0.5685	0.4532	0.0393	9.8622	321 28.6	17.87	14.25	1.23
27	5125	0.6253	0.3704	0.0414	9.8621	329 23.0	19.68	11.66	1.30
Dec. 2	5130	0.6701	0.2805	0.0426	9.8619	337 17.7	21.12	8.84	1.34
7	5135	0.7020	0.1852	0.0430	9.8617	345 12.9	22.16	5.85	1.35
12	5140	0.7205	-0.0864	0.0426	9.8615	353 8.5	22.78	+ 2.73	1.35
17	5145	0.7251	+0.0140	0.0414	9.8612	1 4.8	22.97	- 0.44	1.31
22	5150	0.7157	0.1142	0.0394	9.8609	9 1.7	22.72	3.62	1.25
27	5155	0.6925	0.2122	0.0366	9.8605	16 59.5	22.04	6.75	1.16
32	5160	+0.6559	+0.3062	-0.0331	9.8601	24 58.0	-20.93	- 9.77	+1.06

NOTE.—The Epoch is the 2405,000th day of the Julian Period = 1872, July 25.

# HELIOCENTRIC COÖRDINATES. 405

## THE EARTH.

1872.	Julian Day.	$x$ .	$y$ .	$z$ .	Log Radius Vector.	Longitude in Orbit.	$-\frac{x^2}{r^3} z$ .	$-\frac{y^2}{r^3} y$ .	$-\frac{z^2}{r^3} z$ .
	240								
Jan. 7	4790	-0.1131	+0.9768	0.0000	9.9927	96° 36.3	+ 1.59	-13.71	0.00
17	4800	0.2842	0.9415		9.9927	106° 47.9	3.99	13.21	
27	4810	0.4464	0.8769		9.9929	116° 59.1	6.25	12.28	
Feb. 6	4820	0.5948	0.7851		9.9934	127° 9.3	8.30	10.96	
16	4830	0.7249	0.6690		9.9941	137° 18.0	10.07	9.30	
26	4840	0.8327	0.5324		9.9949	147° 24.6	11.51	7.36	
March 7	4850	0.9150	0.3795		9.9959	157° 28.5	12.56	5.21	
17	4860	0.9696	0.2151		9.9970	167° 29.5	13.21	2.93	
27	4870	0.9950	+0.0442		9.9982	177° 27.4	13.44	- 0.60	
	4880	0.9906	-0.1280		9.9994	187° 21.9	13.27	+ 1.71	
April 6	4890	0.9570	0.2965		0.0007	197° 13.0	12.71	3.94	
16	4900	0.8951	0.4562		0.0019	207° 0.6	11.78	6.01	
26	4910	0.8071	0.6026		0.0031	216° 45.0	10.54	7.87	
May 6	4920	0.6958	0.7317		0.0042	226° 26.5	9.02	9.48	
16	4930	0.5646	0.8397		0.0051	236° 5.3	7.27	10.82	
26	4940	0.4172	0.9238		0.0059	245° 41.8	5.34	11.84	
June 5	4950	0.2580	0.9818		0.0065	255° 16.5	3.29	12.52	
15	4960	-0.0916	1.0120		0.0069	264° 49.8	+ 1.17	12.87	
25	4970	+0.0775	1.0137		0.0072	274° 22.1	- 0.98	12.87	
July 5	4980	0.2442	0.9869		0.0072	283° 53.9	3.10	12.53	
15	4990	0.4041	0.9324		0.0070	293° 26.0	5.14	11.85	
25	5000	0.5528	0.8517		0.0067	302° 58.9	7.06	10.85	
Aug. 4	5010	0.6859	0.7471		0.0061	312° 33.1	8.79	9.56	
14	5020	0.7995	0.6213		0.0054	322° 9.0	10.28	7.98	
24	5030	0.8903	0.4778		0.0045	331° 47.0	11.51	6.18	
Sept. 3	5040	0.9557	0.3207		0.0035	341° 27.5	12.45	4.18	
13	5050	0.9934	-0.1543		0.0023	351° 10.8	13.05	+ 2.03	
23	5060	1.0024	+0.0167		0.0011	0° 57.4	13.27	- 0.22	
Oct. 3	5070	0.9820	0.1872		9.9999	10° 47.5	13.11	2.50	
13	5080	0.9326	0.3520		9.9986	20° 40.9	12.56	4.74	
23	5090	0.8555	0.5063		9.9974	30° 37.6	11.62	6.87	
Nov. 2	5100	0.7527	0.6455		9.9963	40° 37.5	10.30	8.83	
12	5110	0.6270	0.7651		9.9952	50° 40.4	8.64	10.55	
22	5120	0.4821	0.8614		9.9943	60° 46.1	6.69	11.95	
Dec. 2	5130	0.3225	0.9312		9.9937	70° 54.2	4.50	12.98	
12	5140	+0.1529	0.9723		9.9931	81° 4.0	- 2.14	13.61	
22	5150	-0.0214	0.9634		9.9928	91° 14.7	+ 0.30	13.79	
32	5160	-0.1950	+0.9639	0.0000	9.9927	101° 26.4	+ 2.74	-13.52	0.00

## MARS.

1872.	Julian Day.	$x$ .	$y$ .	$z$ .	Log Radius Vector.	Longitude in Orbit.	$-\frac{x^2}{r^3} z$ .	$-\frac{y^2}{r^3} y$ .	$-\frac{z^2}{r^3} z$ .
	240								
Jan. 7	4790	+1.2238	-0.6395	-0.0433	0.1404	332° 24.6	- 0.82	+ 0.43	+0.03
17	4800	1.2875	0.5003	0.0419	0.1405	338° 45.3	0.86	0.33	0.03
27	4810	1.3368	0.3556	0.0400	0.1411	345° 5.4	0.89	0.24	0.03
	4820	1.3711	0.2070	0.0376	0.1421	351° 24.1	0.91	0.14	0.02
Feb. 6	4830	1.3902	-0.0560	0.0349	0.1436	357° 40.6	0.91	+ 0.04	0.02
16	4840	1.3941	+0.0955	0.0317	0.1454	3° 54.2	0.90	- 0.06	0.02
26	4850	1.3830	0.2460	0.0282	0.1476	10° 4.4	0.88	0.16	0.02
March 7	4860	+1.3570	+0.3939	-0.0244	0.1502	16° 10.5	- 0.85	- 0.25	+0.02

NOTE.—The Epoch is the 2405,000th day of the Julian Period = 1872, July 25.

# 406 HELIOCENTRIC COORDINATES.

MARS.									
1872.	Julian Day.	$x$ .	$y$ .	$z$ .	Log Radius Vector.	Longitude in Orbit.	$-\frac{r^2}{r^3}x$ .	$-\frac{r^2}{r^3}y$ .	$-\frac{r^2}{r^3}z$ .
240									
March 17	4870	+1.3168	+0.5377	-0.0204	0.1531	22° 12.0	-0.81	-0.33	+0.01
27	4880	1.2632	0.6760	0.0161	0.1562	28 8.6	0.76	0.41	0.01
April 6	4890	1.1968	0.8075	0.0117	0.1595	34 0.0	0.70	0.47	+0.01
16	4900	1.1187	0.9310	0.0072	0.1630	39 45.9	0.64	0.53	0.00
26	4910	1.0298	1.0456	-0.0026	0.1666	45 26.1	0.58	0.58	0.00
May 6	4920	0.9313	1.1505	+0.0020	0.1703	51 0.7	0.51	0.63	0.00
16	4930	0.8243	1.2449	0.0066	0.1741	56 29.5	0.44	0.67	0.00
26	4940	0.7100	1.3282	0.0112	0.1779	61 52.7	0.37	0.69	-0.01
June 5	4950	0.5895	1.4000	0.0157	0.1816	67 10.4	0.30	0.71	0.01
15	4960	0.4641	1.4600	0.0200	0.1853	72 22.7	0.23	0.72	0.01
25	4970	0.3348	1.5080	0.0241	0.1889	77 29.7	0.16	0.72	0.01
July 5	4980	0.2028	1.5439	0.0281	0.1924	82 31.7	0.09	0.72	0.01
15	4990	+0.0693	1.5677	0.0318	0.1958	87 29.0	-0.03	0.72	0.01
25	5000	-0.0648	1.5795	0.0353	0.1990	92 21.8	+0.03	0.71	0.02
Aug. 4	5010	0.1984	1.5796	0.0386	0.2021	97 10.5	0.09	0.69	0.02
14	5020	0.3306	1.5680	0.0415	0.2049	101 55.2	0.14	0.67	0.02
24	5030	0.4604	1.5452	0.0442	0.2076	106 36.2	0.19	0.65	0.02
Sept. 3	5040	0.5869	1.5115	0.0465	0.2101	111 14.0	0.24	0.63	0.02
13	5050	0.7094	1.4673	0.0485	0.2123	115 48.8	0.29	0.60	0.02
23	5060	0.8270	1.4131	0.0502	0.2143	120 20.9	0.33	0.57	0.02
Oct. 3	5070	0.9391	1.3494	0.0516	0.2161	124 50.6	0.37	0.54	0.02
13	5080	1.0449	1.2768	0.0526	0.2177	129 18.2	0.41	0.50	0.02
23	5090	1.1439	1.1957	0.0533	0.2190	133 44.2	0.44	0.47	0.02
Nov. 2	5100	1.2355	1.1068	0.0536	0.2200	138 8.7	0.48	0.43	0.02
12	5110	1.3190	1.0108	0.0536	0.2208	142 32.0	0.51	0.39	0.02
22	5120	1.3941	0.9083	0.0532	0.2213	146 54.6	0.53	0.35	0.02
Dec. 2	5130	1.4602	0.7999	0.0525	0.2216	151 16.7	0.56	0.31	0.02
12	5140	1.5169	0.6864	0.0514	0.2216	155 38.6	0.58	0.26	0.02
22	5150	1.5640	0.5686	0.0500	0.2214	160 0.6	0.60	0.22	0.02
32	5160	-1.6010	+0.4471	+0.0483	0.2209	164 23.1	+0.61	-0.17	-0.02

JUPITER.										
1872.	Julian Day.	$x$ .	$y$ .	$z$ .	Log Radius Vector.	Longitude in Orbit.	$-\frac{r^2}{r^3}x$ .	$-\frac{r^2}{r^3}y$ .	$-\frac{r^2}{r^3}z$ .	
	240									
Jan	7	4790	-2.08046	+4.80273	+0.02965	0.71884	113° 25' 30"	+65.55	-151.34	-0.93
		4800	2.15039	4.77578	0.03133	0.71914	114 14 40	67.62	150.18	0.99
	17	4810	2.21989	4.74784	0.03300	0.71944	115 3 46	69.66	148.99	1.04
Feb.	27	4820	2.28892	4.71892	0.03467	0.71973	115 52 48	71.68	147.78	1.09
	6	4830	2.35748	4.68903	0.03632	0.72003	116 41 46	73.68	146.54	1.14
	16	4840	2.42556	4.65818	0.03797	0.72032	117 30 39	75.65	145.28	1.18
	26	4850	2.49314	4.62639	0.03961	0.72062	118 19 28	77.60	144.00	1.23
March	7	4860	2.56022	4.59365	0.04125	0.72091	119 8 15	79.53	142.69	1.28
	17	4870	2.62678	4.55997	0.04287	0.72120	119 56 57	81.43	141.36	1.33
	27	4880	2.69280	4.52536	0.04449	0.72149	120 45 35	83.31	140.01	1.38
April	6	4890	2.75827	4.48984	0.04610	0.72178	121 34 9	85.17	138.64	1.43
	16	4900	2.82319	4.45341	0.04770	0.72207	122 22 40	87.00	137.24	1.47
	26	4910	2.88754	4.41608	0.04928	0.72235	123 11 6	88.81	135.83	1.52
May	6	4920	2.95130	4.37786	0.05086	0.72263	123 59 29	90.59	134.38	1.56
	16	4930	-3.01447	+4.33876	+0.05243	0.72292	124 47 48	+92.35	-132.92	-1.61

NOTE.—The Epoch is the 2405,000th day of the Julian Period = 1872, July 25.

# HELIOCENTRIC COÖRDINATES. 407

JUPITER.									
1872.	Julian Day.	$x$ .	$y$ .	$z$ .	Log Radius Vector.	Longitude in Orbit.	$-\frac{x^2}{r^3}x$ .	$-\frac{y^2}{r^3}y$ .	$-\frac{z^2}{r^3}z$ .
	240								
May 26	4940	3.07703	+4.20878	+0.05399	0.72320	125° 26' 3"	+ 94.08	-131.44	-1.65
June 5	4950	3.13898	4.25795	0.05554	0.72347	126 24 14	95.79	129.94	1.70
15	4960	3.20030	4.21627	0.05708	0.72375	127 12 22	97.48	128.42	1.74
25	4970	3.26099	4.17375	0.05860	0.72403	128 0 26	99.14	126.88	1.79
July 5	4980	3.32103	4.13040	0.06011	0.72430	128 48 26	100.77	125.33	1.83
15	4990	3.38040	4.08623	0.06161	0.72457	129 36 23	102.38	123.76	1.87
25	5000	3.43910	4.04124	0.06310	0.72484	130 24 16	103.97	122.17	1.91
Aug. 4	5010	3.49713	3.99545	0.06458	0.72511	131 12 6	105.53	120.56	1.95
14	5020	3.55446	3.94888	0.06604	0.72537	131 59 52	107.06	118.94	1.99
24	5030	3.61109	3.90152	0.06749	0.72563	132 47 35	108.57	117.30	2.03
Sept. 3	5040	3.66700	3.85339	0.06893	0.72589	133 35 14	110.05	115.65	2.07
13	5050	3.72219	3.80450	0.07035	0.72615	134 22 50	111.51	113.98	2.11
23	5060	3.77665	3.75487	0.07176	0.72641	135 10 23	112.94	112.29	2.15
Oct. 3	5070	3.83038	3.70450	0.07316	0.72666	135 57 52	114.35	110.59	2.19
13	5080	3.88335	3.65340	0.07454	0.72691	136 45 17	115.73	108.88	2.22
23	5090	3.93556	3.60159	0.07591	0.72716	137 32 40	117.08	107.15	2.26
Nov. 2	5100	3.98700	3.54908	0.07726	0.72741	138 19 59	118.41	105.41	2.29
12	5110	4.03767	3.49588	0.07860	0.72765	139 7 15	119.71	103.65	2.33
22	5120	4.08755	3.44200	0.07992	0.72789	139 54 28	120.99	101.88	2.36
Dec. 2	5130	4.13664	3.38746	0.08123	0.72813	140 41 38	122.24	100.10	2.40
12	5140	4.18493	3.33226	0.08252	0.72837	141 28 44	123.47	98.31	2.43
22	5150	4.23242	3.27641	0.08379	0.72860	142 15 48	124.67	96.51	2.47
32	5160	4.27909	+3.21994	+0.08505	0.72883	143 2 48	+125.84	- 94.69	-2.50
SATURN.									
1872.	Julian Day.	$x$ .	$y$ .	$z$ .	Log Radius Vector.	Longitude in Orbit.	$-\frac{x^2}{r^3}x$ .	$-\frac{y^2}{r^3}y$ .	$-\frac{z^2}{r^3}z$ .
	240								
Jan. 7	4790	+2.10673	-9.81846	+0.07924	1.00183	282° 6' 2"	-2.81	+13.11	-0.11
17	4800	2.15816	9.80675	0.07698	1.00181	282 24 6	2.88	13.10	0.10
27	4810	2.20952	9.79476	0.07471	1.00178	282 42 11	2.95	13.08	0.10
Feb. 6	4820	2.26082	9.78248	0.07245	1.00176	283 0 15	3.02	13.07	0.10
16	4830	2.31206	9.76992	0.07018	1.00173	283 18 20	3.09	13.05	0.09
26	4840	2.36323	9.75707	0.06791	1.00171	283 36 25	3.16	13.04	0.09
March 7	4850	2.41433	9.74394	0.06564	1.00168	283 54 30	3.23	13.02	0.09
17	4860	2.46536	9.73052	0.06337	1.00165	284 12 35	3.30	13.01	0.09
27	4870	2.51631	9.71682	0.06110	1.00163	284 30 40	3.36	12.99	0.08
April 6	4880	2.56719	9.70284	0.05883	1.00160	284 48 45	3.43	12.98	0.08
16	4890	2.61800	9.68857	0.05655	1.00157	285 6 51	3.50	12.96	0.08
26	4900	2.66873	9.67402	0.05427	1.00154	285 24 57	3.57	12.94	0.07
May 6	4910	2.71938	9.65919	0.05199	1.00151	285 43 3	3.64	12.92	0.07
16	4920	2.76996	9.64408	0.04971	1.00148	286 1 9	3.71	12.91	0.07
26	4930	2.82046	9.62868	0.04742	1.00145	286 19 15	3.78	12.89	0.06
June 5	4940	2.87088	9.61300	0.04514	1.00141	286 37 21	3.85	12.87	0.06
15	4950	2.92121	9.59704	0.04285	1.00138	286 55 28	3.91	12.85	0.06
25	4960	2.97146	9.58079	0.04056	1.00135	287 13 34	3.98	12.84	0.06
July 5	4970	3.02162	9.56426	0.03827	1.00131	287 31 41	4.05	12.82	0.05
15	4980	3.07170	9.54745	0.03598	1.00128	287 49 48	4.12	12.80	0.05
25	4990	3.12168	9.53037	0.03369	1.00124	288 7 56	4.18	12.78	0.05
31	5000	+3.17157	-9.51301	+0.03140	1.00121	288 26 3	-4.25	+12.76	-0.04

NOTE.—The Epoch is the 2453,000th day of the Julian Period = 1872, July 25.

# 408 HELIOCENTRIC COORDINATES.

## SATURN.

1872.	Julian Day.	$x$ .	$y$ .	$z$ .	Log Radius Vector.	Longitude in Orbit.	$-\frac{x^2}{r^3} z$ .	$-\frac{x^2}{r^3} y$ .	$-\frac{y^2}{r^3} z$ .
	240								
Aug. 4	5010	+3.22137	-9.49537	+0.02910	1.00117	288° 44' 11"	-4.32	+12.74	-0.04
14	5020	3.27107	9.47745	0.02681	1.00113	289 2 19	4.39	12.72	0.04
24	5030	3.32068	9.45926	0.02451	1.00109	289 20 27	4.46	12.69	0.03
Sept. 3	5040	3.37019	9.44079	0.02222	1.00106	289 38 35	4.53	12.67	0.03
13	5050	2.41961	9.42204	0.01992	1.00102	289 56 43	4.59	12.65	0.03
23	5060	3.46893	9.40301	0.01763	1.00098	290 14 52	4.66	12.63	0.02
Oct. 3	5070	3.51814	9.38371	0.01533	1.00093	290 33 1	4.73	12.61	0.02
13	5080	3.56725	9.36413	0.01304	1.00089	290 51 10	4.80	12.59	0.02
23	5090	3.61626	9.34427	0.01074	1.00085	291 9 19	4.86	12.56	0.91
Nov. 2	5100	3.66516	9.32414	0.00844	1.00081	291 27 29	4.93	12.54	0.01
12	5110	3.71396	9.30374	0.00614	1.00077	291 45 39	4.99	12.51	0.01
22	5120	3.76265	9.28307	0.00384	1.00072	292 3 49	5.06	12.49	-0.01
Dec. 2	5130	3.81122	9.26212	+0.00154	1.00068	292 21 59	5.13	12.47	0.00
12	5140	3.85968	9.24090	-0.00076	1.00063	292 40 9	5.20	12.44	0.00
22	5150	3.90803	9.21941	0.00306	1.00059	292 58 20	5.26	12.41	0.00
32	5160	+3.95627	-9.19765	-0.00536	1.00054	293 16 31	-5.33	+12.39	+0.01

## URANUS.

1872.	Julian Day.	$x$ .	$y$ .	$z$ .	Log Radius Vector.	Longitude in Orbit.	$-\frac{x^2}{r^3} z$ .	$-\frac{x^2}{r^3} y$ .	$-\frac{y^2}{r^3} z$ .
	240								
Jan. 7	4800	-9.01878	+16.25082	+0.18029	1.26920	119° 1' 45"	+0.27	-0.48	-0.01
Feb. 16	4840	9.15773	16.16646	0.18176	1.26908	119 31 48	0.27	0.48	0.01
Mar. 27	4880	9.29600	16.08087	0.18321	1.26894	120 1 52	0.28	0.48	0.01
May 6	4920	9.43357	15.99407	0.18465	1.26881	120 31 58	0.28	0.47	0.01
June 15	4960	9.57043	15.90611	0.18609	1.26868	121 2 4	0.28	0.47	0.01
July 25	5000	9.70657	15.81696	0.18752	1.26855	121 32 12	0.29	0.47	0.01
Sept. 3	5040	9.84199	15.72663	0.18892	1.26842	122 2 20	0.29	0.47	0.01
Oct. 13	5080	9.97666	15.63510	0.19031	1.26830	122 32 30	0.29	0.46	0.01
Nov. 22	5120	10.11058	15.54240	0.19168	1.26817	123 2 41	0.30	0.46	0.01
Dec. 32	5160	10.24373	+15.44853	+0.19304	1.26804	123 32 52	+0.30	-0.46	-0.01

## NEPTUNE.

1872.	Julian Day.	$x$ .	$y$ .	$z$ .	Log Radius Vector.	Longitude in Orbit.	$-\frac{x^2}{r^3} z$ .	$-\frac{x^2}{r^3} y$ .	$-\frac{y^2}{r^3} z$ .
	240								
Jan. 7	4800	+27.4100	+11.7338	-0.8861	1.47465	23° 11.0	-0.26	-0.11	+0.01
Feb. 16	4840	27.3596	11.8499	0.8872	1.47464	23 25.6	0.26	0.11	0.01
Mar. 27	4880	27.3086	11.9657	0.8883	1.47463	23 40.2	0.26	0.11	0.01
May 6	4920	27.2571	12.0813	0.8894	1.47462	23 54.7	0.26	0.11	0.01
June 15	4960	27.2050	12.1966	0.8905	1.47461	24 9.3	0.26	0.12	0.01
July 25	5000	27.1525	12.3117	0.8915	1.47461	24 23.9	0.26	0.12	0.01
Sept. 3	5040	27.0995	12.4266	0.8926	1.47460	24 38.5	0.26	0.12	0.01
Oct. 13	5080	27.0460	12.5412	0.8936	1.47459	24 53.1	0.26	0.12	0.01
Nov. 22	5120	26.9920	12.6556	0.8947	1.47458	25 7.7	0.26	0.12	0.01
Dec. 32	5160	+26.9376	+12.7698	-0.8957	1.47457	25 22.2	-0.26	-0.12	+0.01

NOTE.—The Epoch is the 2405,000th day of the Julian Period = 1872, July 25.

## INCLINATIONS AND NODES.

Planet.	Inclination.	Increase in 100 Days.	Longitude of Ascending Node.	Increase in 100 Days.
Mercury . . .	7° 0' 9.8"	+0.01947	46° 49' 3"	+11.643
Venus . . .	3 23 35.4	+0.01195	75 33 5	9.004
Mars . . .	1 51 1.8	—0.00586	48 34 2	7.585
Jupiter . . .	1 18 35.1	—0.06189	99 7 16	9.402
Saturn . . .	2 29 19.2	—0.03824	112 30 56	8.425
Uranus . . .	0 46 30.2	+0.00835	73 20 59	4.898
Neptune . . .	1 46 54.3	—0.09020	130 22 29	+10.885

NOTE.—The Epoch is the 2405,000th day of the Julian Period = 1872, July 25.

## MASSES. SUN'S=1.

Planet.	Mass.	Log. of Mass.	Authority.
Mercury . .	$\frac{1}{4865751} = .000\ 000\ 206$	93.31285	ENCKE, <i>A. N.</i> , No. 443.
Venus . . .	$\frac{1}{390000} = .000\ 002\ 564$	94.40893	LE VERRIER, <i>Théor. de Merc.</i> , p. 115.
The Earth .	$\frac{1}{354936} = .000\ 002\ 817$	94.44985	LE VERRIER, <i>Théor. de Merc.</i> , p. 26.
Mars . . .	$\frac{1}{2680637} = .000\ 000\ 373$	93.57176	BURCKHARDT, <i>Conn. des Temps.</i> , 1816, p. 343.
Jupiter . .	$\frac{1}{1047.879 \pm .235} = .000\ 954\ 308$	96.979689	BESSEL, <i>Die Masse des Jupiter</i> , p. 64.
Saturn . . .	$\frac{1}{3501.6} = .000\ 285\ 584$	96.455733	BESSEL, <i>Comptes Rendus</i> , 1841.
Uranus . . .	$\frac{1}{24905} = .000\ 040\ 153$	95.60371	LAMONT, <i>Mém. Ast. Soc.</i> , Vol. XI. p. 54.
Neptune . .	$\frac{1}{18780} = .000\ 053\ 248$	95.72630	PIERCE, <i>Am. Ac. Proc.</i> , Vol. I. p. 333.



## ECLIPSES IN 1872.

In the year 1872 there will be four Eclipses; two of the Sun, and two of the Moon.

I. A Partial Eclipse of the Moon, May 22, 1872, invisible at Washington, with the following elements:

Washington mean time of  $\delta$  in Right Ascension, May 22<sup>d</sup> 5<sup>h</sup> 39<sup>m</sup> 14.1<sup>s</sup>.

Sun's Right Ascension	3 <sup>h</sup> 59 <sup>m</sup> 54.67 <sup>s</sup>	Hourly Motion	10.05
Moon's Right Ascension	15 59 54.67	" "	148.67
Sun's Declination	+20° 35' 27.0"	Hourly Motion	+ 0° 28.7"
Moon's Declination	-19 35 11.6	" "	-10 29.3
Sun's Equa. Hor. Par.	8.5	True Semidiameter	15 49.7
Moon's Equa. Hor. Par.	60 1.9	" "	16 20.7

From these elements may be deduced the following results:—

Moon enters Penumbra,	May 22 <sup>d</sup> 4 <sup>h</sup> 1.5 <sup>m</sup>	Washington mean time.
Moon enters Shadow	22 5 32.1	" "
Middle of the Eclipse	22 6 10.2	" "
Moon leaves Shadow	22 6 48.4	" "
Moon leaves Penumbra	22 8 19.0	" "

First contact of Shadow with Moon's limb 176° from north point towards the East, when the Moon is in the zenith in longitude 263° 58' West from Washington, and in latitude 19° 41' South.

Last contact of Shadow with Moon's limb 142° from north point towards the West, when the Moon is in the zenith in longitude 282° 19' West from Washington, and in latitude 19° 54' South.

Magnitude of Eclipse = 0.121 (Moon's diameter = 1).

II. An Annular Eclipse of the Sun, June 5, 1872, invisible at Washington, with the following elements:

Washington mean time of  $\delta$  in Right Ascension, June 5<sup>d</sup> 10<sup>h</sup> 19<sup>m</sup> 16.1<sup>s</sup>.

Sun's and Moon's R. A.	4 <sup>h</sup> 57 <sup>m</sup> 46.23 <sup>s</sup>	Hourly Motions	10.31 and 129.29
Sun's Declination	+22° 41' 7.8"	Hourly Motion	+0° 15.3"
Moon's Declination	+22 58 21.0	" "	+6 0.2
Sun's Equa. Hor. Par.	8.4	True Semidiameter	15 47.6
Moon's Equa. Hor. Par.	54 39.1	" "	14 52.8

From these elements may be deduced the following results:—

Eclipse begins on the Earth June 5<sup>d</sup> 7<sup>h</sup> 12<sup>m</sup>.6, Washington mean time, in longitude 196° 22'.7 West from Washington, and in latitude 0° 28'.4 South.

Central Eclipse begins on the Earth 8<sup>h</sup> 20<sup>m</sup>.5, in longitude 217° 54'.1 West from Washington, and in latitude 5° 40'.4 North.

Central Eclipse at Noon 10<sup>h</sup> 19<sup>m</sup>.3, in longitude 155° 13'.6 West from Washington, and in latitude 41° 19'.0 North.

Central Eclipse ends on the Earth 12<sup>h</sup> 2<sup>m</sup>.8, in longitude 78° 36'.9 West from Washington, and in latitude 27° 29'.9 North.

Eclipse ends on the Earth 13<sup>h</sup> 10<sup>m</sup>.7, in longitude 98° 41'.3 West from Washington, and in latitude 21° 27'.9 North.

**OUTLINES AND PATH OF THE PENUMBRA, AND THE CENTRAL LINE  
OF THE ANNULAR ECLIPSE OF JUNE 5, 1872.**

## DATA FOR COMPUTING THE ECLIPSE FOR ANY PLACE, FOR PENUMBRA.

Wash. M. Time.	A.	B.	C.	log E.	log F.	log G.	log H.	$\mu$
<sup>h</sup> <sup>m</sup>				9.96	9.96	+9.58	+9.59	
7 10	-1.58447	+0.54388	-0.58092	5910	4234	1148	0749	107° 54' 43.4
7 20	1.50078	0.56165	0.56320	5908	4232	1160	0761	110 24 43.0
7 30	1.41709	0.57941	0.54549	5905	4230	1173	0773	112 54 42.6
7 40	1.33339	0.59716	0.52779	5903	4228	1185	0785	115 24 42.3
7 50	1.24969	0.61490	0.51009	5901	4226	1197	0797	117 54 41.9
8 0	1.16599	0.63262	0.49240	5899	4223	1210	0809	120 24 41.5
8 10	1.08229	0.65034	0.47472	5897	4221	1222	0821	122 54 41.2
8 20	0.99858	0.66805	0.45704	5895	4219	1234	0833	125 24 40.8
8 30	0.91487	0.68575	0.43937	5893	4217	1247	0845	127 54 40.4
8 40	0.83116	0.70344	0.42171	5891	4215	1259	0857	130 24 40.1
8 50	0.74744	0.72113	0.40406	5889	4213	1271	0869	132 54 39.7
9 0	0.66372	0.73881	0.38641	5887	4211	1284	0881	135 24 39.4
9 10	0.58000	0.75648	0.36877	5884	4208	1296	0893	137 54 39.0
9 20	0.49627	0.77414	0.35114	5882	4206	1308	0905	140 24 38.6
9 30	0.41254	0.79179	0.33352	5880	4204	1321	0917	142 54 38.3
9 40	0.32881	0.80943	0.31591	5878	4202	1333	0929	145 24 37.9
9 50	0.24508	0.82706	0.29830	5876	4200	1345	0941	147 54 37.5
10 0	0.16135	0.84468	0.28070	5874	4198	1358	0953	150 24 37.2
10 10	-0.07762	0.86229	0.26311	5872	4195	1370	0965	152 54 36.8
10 20	+0.00611	0.87990	0.24553	5870	4193	1382	0977	155 24 36.4
10 30	0.08985	0.89750	0.22795	5868	4191	1394	0989	157 54 36.1
10 40	0.17358	0.91509	0.21038	5866	4189	1407	1001	160 24 35.7
10 50	0.25732	0.93267	0.19282	5864	4187	1419	1013	162 54 35.3
11 0	0.34106	0.95024	0.17528	5861	4185	1431	1025	165 24 35.0
11 10	0.42479	0.96780	0.15774	5859	4183	1443	1037	167 54 34.6
11 20	0.50853	0.98535	0.14021	5857	4180	1456	1049	170 24 34.2
11 30	0.59227	1.00290	0.12268	5855	4178	1468	1061	172 54 33.9
11 40	0.67601	1.02043	0.10516	5853	4176	1480	1073	175 24 33.5
11 50	0.75975	1.03795	0.08765	5851	4174	1492	1085	177 54 33.1
12 0	0.84348	1.05546	0.07016	5849	4172	1505	1097	180 24 32.7
12 10	0.92722	1.07296	0.05267	5847	4170	1517	1109	182 54 32.4
12 20	1.01096	1.09045	0.03519	5845	4168	1529	1121	185 24 32.0
12 30	1.09469	1.10793	0.01771	5843	4165	1541	1132	187 54 31.6
12 40	1.17843	1.12540	-0.00024	5841	4163	1553	1144	190 24 31.3
12 50	1.26216	1.14286	+0.01722	5839	4161	1566	1156	192 54 30.9
13 0	1.34589	1.16032	0.03466	5837	4159	1578	1168	195 24 30.5
13 10	1.42962	1.17777	0.05210	5834	4157	1590	1180	197 54 30.2
13 20	+1.51335	+1.19521	+0.06953	5832	4155	1602	1192	200 24 29.8

## FOR SHADOW.

Washington Mean Time.	B.	C.	Washington Mean Time.	B.	C.
<sup>h</sup> <sup>m</sup>			<sup>h</sup> <sup>m</sup>		
8 20	+0.12210	+0.08891	10 20	+0.33395	+0.30042
8 30	0.13980	0.10658	10 30	0.35155	0.31800
8 40	0.15749	0.12424	10 40	0.36914	0.33557
8 50	0.17518	0.14189	10 50	0.38672	0.35313
9 0	0.19286	0.15954	11 0	0.40429	0.37067
9 10	0.21053	0.17718	11 10	0.42185	0.38821
9 20	0.22819	0.19481	11 20	0.43940	0.40574
9 30	0.24584	0.21243	11 30	0.45695	0.42327
9 40	0.26348	0.23004	11 40	0.47448	0.44079
9 50	0.28111	0.24765	11 50	0.49200	0.45830
10 0	0.29873	0.26525	12 0	0.50951	0.47579
10 10	+0.31634	+0.28284	12 10	+0.52701	+0.49328

A and  $\mu$  are the same as for Penumbra, and the values of log E, log F, log G, and log H may be obtained from corresponding values for Penumbra, by numerically decreasing log E and increasing log F by 0.000004 and by numerically increasing log G and decreasing log H by 0.000023.

CHANGES OF THE QUANTITIES IN THE TABLE OF DATA IN UNITS OF THE SIXTH PLACE OF DECIMALS.

Washington Mean Time.	For one Minute.			For one Second.		
	A.	B.	C.	A'.	B'.	C'.
<sup>h</sup> <sup>m</sup>						
7 0	+8368.3	+1777.8	+1773.0	+139.47	+29.63	+29.55
7 30	8369.5	1775.2	1770.8	139.49	29.59	29.51
8 0	8370.4	1772.5	1768.7	139.51	29.54	29.48
8 30	8371.2	1769.8	1766.5	139.52	29.50	29.44
9 0	8372.0	1767.1	1764.2	139.53	29.45	29.40
9 30	8372.7	1764.5	1761.8	139.54	29.41	29.36
10 0	8373.2	1761.9	1759.4	139.55	29.36	29.32
10 30	8373.5	1759.2	1757.0	139.56	29.32	29.28
11 0	8373.7	1756.5	1754.5	139.56	29.27	29.24
11 30	8373.7	1753.7	1752.0	139.56	29.23	29.20
12 0	8373.7	1750.7	1749.5	139.56	29.18	29.16
12 30	8373.5	1747.7	1747.0	139.56	29.13	29.12
13 0	8373.1	1744.8	1744.4	139.55	29.08	29.07
13 30	+8372.5	+1742.0	+1741.7	+139.54	+29.03	+29.03

III. A Partial Eclipse of the Moon, November 14, 1872, visible at Washington, with the following elements:

Washington mean time of  $\delta$  in Right Ascension, November 14 <sup>d</sup> <sup>h</sup> <sup>m</sup> <sup>s</sup> 11 30 25.0.

Sun's Right Ascension	<sup>h</sup> <sup>m</sup> <sup>s</sup> 15 23 4.98	Hourly Motion	10.28
Moon's Right Ascension	3 23 4.98	" "	129.36
Sun's Declination	-18° 34' 43.1	Hourly Motion	- 0' 38.1
Moon's Declination	+17 34 59.7	" "	+11 4.7
Sun's Equa. Hor. Par.	8.7	True Semidiameter	16 13.2
Moon's Equa. Hor. Par.	56 46.3	" "	15 27.4

From these elements may be deduced the following results:

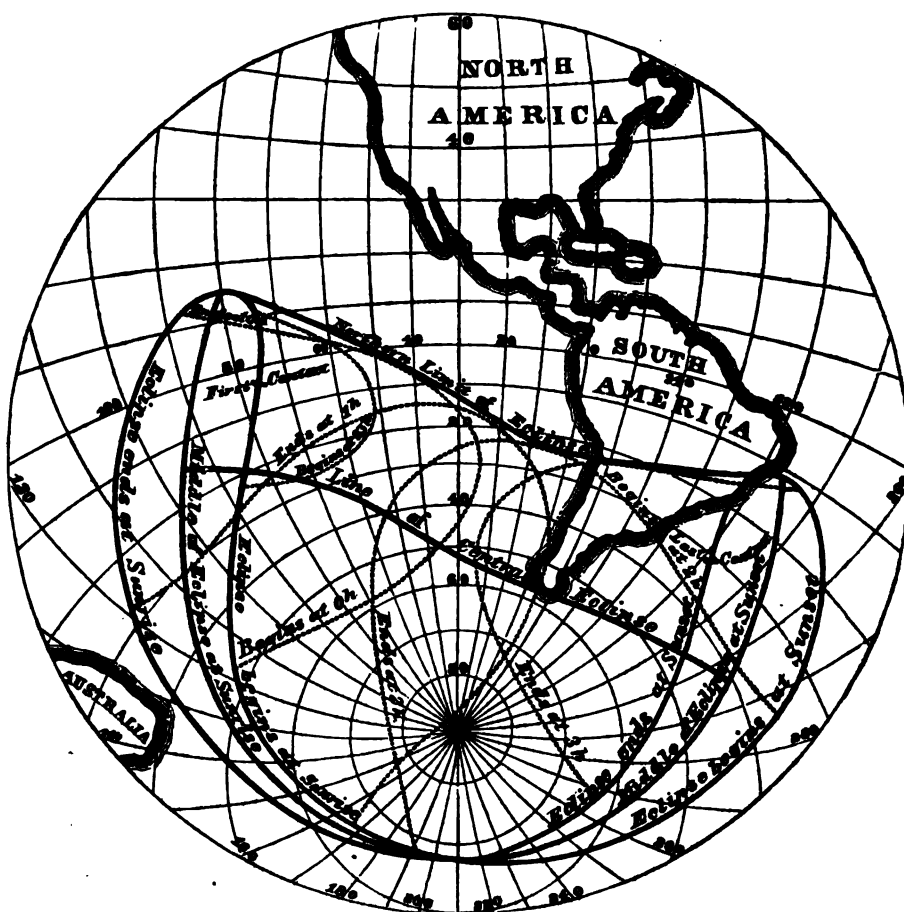
Moon enters Penumbra, November	<sup>d</sup> <sup>h</sup> <sup>m</sup> 14 9 53.2	Washington mean time.	
Moon enters Shadow	14 11 51.1	" "	
Middle of the Eclipse	14 12 11.3	" "	
Moon leaves Shadow	14 12 31.5	" "	
Moon leaves Penumbra	14 14 29.5	" "	

First contact of Shadow with Moon's limb 10° from north point towards the West, when the Moon is in the zenith, in longitude 1° 25' West from Washington, and in latitude 17° 45' North.

Last contact of Shadow with Moon's limb 30° from north point towards the West, when the Moon is in the zenith, in longitude 11° 10' West from Washington, and in latitude 17° 53' North.

Magnitude of Eclipse = 0.030 (Moon's diameter = 1).

OUTLINES AND PATH OF THE PENUMBRA, AND THE CENTRAL LINE  
OF THE ANNULAR ECLIPSE OF NOVEMBER 29-30, 1872.



IV. An Annular Eclipse of the Sun, November 29—30, 1872, invisible at Washington, with the following elements:

Washington mean time of $\delta$ in Right Ascension, November 30 <sup>d</sup> 1 <sup>h</sup> 35 <sup>m</sup> 10.3 <sup>s</sup> .			
Sun's and Moon's R. A.	16 <sup>h</sup> 28 <sup>m</sup> 53.90 <sup>s</sup>	Hourly Motions	10.80 and 149.67
Sun's Declination	—21° 48' 20.3"	Hourly Motion	— 0' 23.5"
Moon's Declination	—22 19 21.7	" "	— 8 42.5
Sun's Equa. Hor. Par.	8.7	True Semidiameter	16 16.0
Moon's Equa. Hor. Par.	59 17.7	" "	16 8.7

From these elements may be deduced the following results:

Eclipse begins on the Earth November 29<sup>d</sup> 22<sup>h</sup> 44<sup>m</sup>.6, Washington mean time, in longitude 75° 34'.6 West from Washington, and in latitude 4° 17'.6 South.

Central Eclipse begins on the Earth 29<sup>d</sup> 23<sup>h</sup> 48<sup>m</sup>.9, in longitude 96° 1'.5 West from Washington, and in latitude 14° 54'.7 South.

Central Eclipse at Noon 30<sup>d</sup> 1<sup>h</sup> 35<sup>m</sup>.2, in longitude 26° 30'.5 West from Washington, and in latitude 80° 7'.2 South.

Central Eclipse ends on the Earth 30<sup>d</sup> 2<sup>h</sup> 53<sup>m</sup>.1, in longitude 295° 34'.1 West from Washington, and in latitude 41° 16'.1 South.

Eclipse ends on the Earth 30<sup>d</sup> 3<sup>h</sup> 57<sup>m</sup>.5, in longitude 318° 11'.2 West from Washington, and in latitude 31° 6'.4 South.

The Eclipse becomes total from the augmentation of the Moon's diameter on that portion of the central line which lies between the positions, 72°.8 in longitude West from Washington and 27°.3 in South latitude, and 324°.4 in longitude West from Washington and 51°.5 in South latitude.

#### DATA FOR COMPUTING THE ECLIPSE FOR ANY PLACE, FOR PENUMBRA.

Wash. M. Time.	A.	B.	C.	log E.	log F.	log G.	log H.	$\mu$
<sup>h</sup> <sup>m</sup>				9.96	9.96	—9.57	—9.56	
22 40	—1.58457	+0.43508	—0.66123	6991	8641	4680	4347	342° 43' 20.0"
22 50	1.49416	0.41151	0.68478	6988	8638	4700	4367	345 13 18.5
23 0	1.40374	0.38795	0.70833	6984	8635	4719	4387	347 43 17.0
23 10	1.31331	0.36440	0.73187	6981	8632	4738	4407	350 13 15.5
23 20	1.22288	0.34086	0.75539	6978	8629	4758	4427	352 43 14.0
23 30	1.13244	0.31732	0.77890	6975	8626	4777	4447	355 13 12.5
23 40	1.04199	0.29379	0.80240	6972	8623	4796	4467	357 43 11.0
23 50	0.95154	0.27027	0.82589	6968	8620	4815	4486	0 13 9.5
0 0	0.86109	0.24676	0.84938	6965	8617	4835	4506	2 43 8.0
0 10	0.77063	0.22326	0.87286	6962	8613	4854	4526	5 13 6.4
0 20	0.68017	0.19977	0.89633	6959	8610	4873	4546	7 43 4.9
0 30	0.58970	0.17628	0.91978	6956	8607	4893	4566	10 13 3.4
0 40	0.49923	0.15280	0.94322	6953	8604	4912	4586	12 43 1.9
0 50	0.40875	0.12933	0.96666	6949	8601	4931	4605	15 13 0.4
1 0	0.31827	0.10587	0.99009	6946	8598	4950	4625	17 42 58.9
1 10	0.22778	0.08242	1.01351	6943	8595	4970	4645	20 12 57.4
1 20	0.13729	0.05898	1.03692	6940	8592	4989	4665	22 42 55.9
1 30	—0.04680	0.03555	1.06031	6937	8589	5008	4685	25 12 54.4
1 40	+0.04369	+0.01213	1.08370	6934	8586	5028	4704	27 42 52.9
1 50	0.13419	—0.01128	1.10708	6930	8583	5047	4724	30 12 51.3
2 0	0.22469	0.03468	1.13044	6927	8580	5066	4744	32 42 49.8
2 10	+0.31519	—0.05807	—1.15379	6924	8577	5085	4764	35 12 48.3

## DATA FOR COMPUTING THE ECLIPSE FOR ANY PLACE, FOR PENUMBRA.

Wash. M. Time.	A.	B.	C.	log E.	log F.	log G.	log H.	$\mu$
h m				9.96	9.96	-9.57	-9.56	
2 20	+0.40570	-0.08145	-1.17713	6921	8573	5104	4783	37° 42' 46.8
2 30	0.49621	0.10483	1.20047	6918	8570	5124	4803	40 12 45.3
2 40	0.58672	0.12820	1.22379	6915	8567	5143	4823	42 42 43.8
2 50	0.67723	0.15156	1.24710	6911	8564	5162	4843	45 12 42.3
3 0	0.76774	0.17491	1.27039	6908	8561	5181	4862	47 42 40.8
3 10	0.85825	0.19825	1.29367	6905	8558	5200	4882	50 12 39.3
3 20	0.94876	0.22158	1.31694	6902	8555	5220	4902	52 42 37.7
3 30	1.03928	0.24490	1.34021	6899	8552	5239	4921	55 12 36.2
3 40	1.12979	0.26821	1.36347	6896	8549	5258	4941	57 42 34.7
3 50	1.22031	0.29150	1.38671	6892	8546	5277	4961	60 12 33.2
4 0	+1.31083	-0.31478	-1.40994	6889	8543	5296	4981	62 42 31.7

## FOR SHADOW.

Washington Mean Time.	B.	C.	Washington Mean Time.	B.	C.
h m			h m		
23 40	-0.25209	-0.25652	1 20	-0.48689	-0.49105
23 50	0.27561	0.28002	1 30	0.51032	0.51444
0 0	0.29911	0.30351	1 40	0.53374	0.53782
0 10	0.32261	0.32699	1 50	0.55715	0.56120
0 20	0.34610	0.35046	2 0	0.58056	0.58456
0 30	0.36959	0.37391	2 10	0.60395	0.60791
0 40	0.39307	0.39735	2 20	0.62733	0.63125
0 50	0.41654	0.42079	2 30	0.65071	0.65459
1 0	0.44000	0.44422	2 40	0.67408	0.67791
1 10	0.46345	0.46764	2 50	0.69744	0.70122
1 20	-0.48689	-0.49105	3 0	-0.72079	-0.72451

A and  $\mu$  are given in the Table for Penumbra, and the values of log E, log F, log G, and log H may be obtained from corresponding values for Penumbra, by numerically increasing log E and decreasing log F by 0.000004, and by numerically decreasing log G by 0.000024 and increasing log H by 0.000025.

## CHANGES OF THE QUANTITIES IN THE TABLES OF DATA IN UNITS OF THE SIXTH PLACE OF DECIMALS.

Washington Mean Time.	For one Minute.			For one Second.		
	A.	B.	C.	A'.	B'.	C'.
h m						
22 30	+9040.3	-2358.0	-2356.7	+150.67	-39.30	-39.28
23 0	9042.4	2355.6	2353.9	150.71	39.26	39.23
23 30	9044.2	2353.2	2351.0	150.74	39.22	39.18
0 0	9045.7	2350.7	2348.1	150.76	39.18	39.13
0 30	9047.0	2348.2	2345.2	150.78	39.14	39.09
1 0	9048.2	2345.5	2342.2	150.80	39.09	39.04
1 30	9049.3	2342.7	2339.0	150.82	39.05	38.98
2 0	9050.2	2340.0	2335.8	150.84	39.00	38.93
2 30	9050.8	2337.2	2332.5	150.85	38.95	38.87
3 0	9051.2	2334.3	2329.2	150.85	38.90	38.82
3 30	9051.5	2331.2	2325.8	150.86	38.85	38.76
4 0	+9051.5	-2328.0	-2322.3	+150.86	-38.80	-38.70

# OCCULTATIONS, 1872.

417

## OCCULTATIONS OF PLANETS AND STARS BY THE MOON, VISIBLE AT WASHINGTON, D. C., DURING THE YEAR 1872.

Date.	Star's Name.	Magnitude.	IMMERSION.				EMERSION.				Duration of Oc- culation.
			Washington		Angle from		Washington		Angle from		
			Sidereal Time.	Mean Time.	North Point.	Ver- tex.	Sidereal Time.	Mean Time.	North Point.	Ver- tex.	
			h m	h m	°	°	h m	h m	°	°	h m
Jan. 19	B. A. C. 1240	6	9 21	13 30	228	281	9 59	14 7	154	206	0 37
21	B. A. C. 1774	6½	8 18	12 15	277	334	9 37	13 33	86	144	1 19
21	B. A. C. 1801	6	10 41	14 38	250	306	11 40	15 37	109	162	0 59
23	48 Geminor.	6	1 14	5 4	300	245	2 12	6 2	75	18	0 58
29	c Virginis	5	8 48	12 13	329	283	Star 3/2	north of	D's	limb.	
31	B. A. C. 4647	6	9 13	12 10	151	103	Star 1/6	south of	D's	limb.	
Feb. 12	29 Ceti	6½	3 35	6 6	317	355	4 45	7 15	107	153	1 10
12	33 Ceti	6	5 22	7 53	329	18	6 16	8 47	88	138	0 54
12	35 Ceti	6½	6 14	8 44	287	337	7 11	9 42	123	174	0 58
14	38 Arietis	5	3 46	6 9	321	348	5 5	7 28	98	142	1 19
18	5 Geminor.	6	8 2	10 9	329	21	8 46	10 53	30	87	0 44
19	ω Geminor.	6	7 19	9 22	178	195	Star 0/0	south of	D's	limb.	
19	48 Geminor.	6	12 46	14 48	298	353	13 32	15 33	41	93	0 45
20	μ¹ Cancri	6	13 59	15 57	206	269	14 36	16 34	124	175	0 37
21	γ Cancri	4½	4 50	6 45	190	133	5 11	7 6	158	101	0 22
23	42 Leonis	6	3 55	5 42	247	196	4 55	6 42	84	31	1 0
23	B. A. C. 3579	6	8 8	9 55	228	184	9 31	11 17	80	57	1 22
23	i Leonis	6	10 35	12 21	277	281	11 40	13 27	19	49	1 6
29	ζ² Libræ	7	12 38	14 0	226	193	13 50	15 12	73	52	1 12
29	B. A. C. 5099	7	12 50	14 12	281	249	13 46	15 8	18	356	0 56
Mar. 2	b Ophiuchi	5	13 5	14 19	241	197	14 9	15 24	81	45	1 4
3	λ Sagittarii†	3	12 50	14 1	251	201	13 48	14 59	85	39	0 58
4	λ² Sagittarii	4½	15 21.	17 27	335	292	15 45	17 51	18	338	0 24
6	B. A. C. 7550	6	16 56	17 54	192	145	Star 0/9	south of	D's	limb.	
12	ξ Arietis	5½	5 23	5 59	284	332	6 33	7 10	126	178	1 11
12	B. A. C. 755	6	6 57	7 32	202	254	Star 1/3	south of	D's	limb.	
14	ω¹ Tauri	6	8 39	9 7	308	4	9 38	10 6	73	127	0 59
18	B. A. C. 2114	6½	9 59	10 11	296	352	10 59	11 11	35	93	1 0
23	ν Virginis	4½	8 4	7 57	233	175	9 16	9 9	60	20	1 12
25	65 Virginis	6	9 44	9 29	148	105	Star 0/9	south of	D's	limb.	
25	β Virginis	5	15 43	15 27	179	212	16 25	16 9	110	149	0 42
26	κ Virginis	4½	9 9	8 50	201	152	9 56	9 36	100	54	0 47
26	2 Libræ	6	15 33	15 12	245	263	16 50	16 30	55	88	1 18
28	β¹ Scorpis	2	11 23	10 56	334	288	Star 1/7	north of	D's	limb.	
28	β² Scorpis	5½	11 23	10 56	334	288	Star 2/0	north of	D's	limb.	
31	B. A. C. 6562*	6½	14 5	13 25	173	124	Star 0/7	south of	D's	limb.	
Apr. 2	33 Capricorni	6	17 43	16 55	283	244	18 57	18 8	104	75	1 14
5	33 Piscium†	5	17 36	16 36	302	251	18 32	17 32	103	53	0 56
14	52 Geminor.	6	7 48	6 14	279	308	9 15	7 41	64	119	1 27
22	B. A. C. 4647	6	10 47	8 41	296	258	11 21	9 15	354	320	0 34
23	μ Libræ	6	11 59	9 49	224	190	13 9	10 59	68	45	1 10
24	λ Libræ	6	17 41	15 26	158	183	Star 0/9	south of	D's	limb.	
25	22 Ophiuchi	6½	17 29	15 11	249	258	18 47	16 29	83	108	1 18
27	σ Sagittarii	2½	14 43	12 17	171	136	Star 1/3	south of	D's	limb.	
May 15	B. A. C. 3579†	6	16 23	12 46	264	316	17 14	13 38	48	97	0 52
20	2 Libræ	6	12 22	8 26	183	156	13 7	9 11	107	90	0 45
23	39 Oph. mult.*	6	11 33	7 25	225	174	12 22	8 14	98	48	0 49
23	B. A. C. 5831*	6	11 26	7 18	270	219	12 18	8 11	53	5	0 52
27	B. A. C. 7550†	6	16 18	11 53	311	261	17 12	12 47	72	27	0 54
June 13	ν Virginis*	4½	18 10	12 39	307	357	18 36	13 4	4	53	0 26
16	96 Virginis†	6½	19 1	13 18	240	269	20 0	14 17	76	127	0 59
18	λ Libræ	6	16 49	10 58	155	169	Star 1/7	north of	D's	limb.	
19	22 Ophiuchi	6½	15 46	9 51	256	243	17 4	11 9	65	69	1 18
21	B. A. C. 6562	6½	18 43	12 40	329	324	19 27	13 24	37	42	0 44
23	33 Capricorni	6	19 16	13 5	357	332	19 41	13 30	36	16	0 26
23	35 Capricorni	6	20 47	14 36	202	195	Star 2/1	north of	D's	limb.	



# OCCULTATIONS OF PLANETS AND STARS BY THE MOON, VISIBLE AT WASHINGTON, D. C., DURING THE YEAR 1872.

Date.	Star's Name.	Magnitude.	IMMERSION.				EMERSION.				Duration of Oc- cultation.
			Washington		Angle from		Washington		Angle from		
			Sidereal Time.	Mean Time.	North Point.	Ver- tex.	Sidereal Time.	Mean Time.	North Point.	Ver- tex.	
			<sup>h</sup> <sup>m</sup>	<sup>h</sup> <sup>m</sup>	<sup>°</sup>	<sup>°</sup>	<sup>h</sup> <sup>m</sup>	<sup>h</sup> <sup>m</sup>	<sup>°</sup>		<sup>h</sup> <sup>m</sup>
June 26	B. A. C. 17	6½	19 31	13 8	312	264	20 36	14 13	104	62	1 5
27	26 Ceti, <i>mult.</i>	6½	22 48	16 21	341	307	23 52	17 25	91	72	1 4
July 22	♊ Aquarii	4	17 29	9 24	18	329	Star 3/8 south of	♏'s	limb.	92	1 17
26	♈ Arietis	5½	23 34	15 13	308	263	0 51	16 30	122	92	1 17
31	B. A. C. 2154	6½	23 36	14 55	202	152	23 52	15 11	168	117	0 16
Aug. 5	B. A. C. 3579*	6	17 43	8 44	338	25	Star 2/2 south of	♏'s	limb.		
9	♍ Virginis†	5	19 4	9 49	301	350	19 39	10 23	13	64	0 34
11	♎ Libræ	5	16 55	7 32	268	293	18 7	8 44	44	81	1 12
11	♎ Libræ	6½	17 15	7 52	226	255	18 27	9 4	86	126	1 12
12	♏ Scorpii†	4½	20 41	11 14	311	358	21 20	11 52	28	78	0 39
15	B. A. C. 6562	6½	20 1	10 22	6	17	Star 1/4 north of	♏'s	limb.		
17	33 Capricor.	6	19 39	9 52	326	305	20 41	10 54	73	65	1 2
17	37 Capricor.	6	1 21	15 33	241	282	1 55	16 7	170	216	0 34
17	ε Capricor.*	4½	2 28	16 40	318	7	3 17	17 29	90	141	0 49
21	26 Ceti, <i>mult.*</i>	6½	17 53	7 50	295	245	18 46	8 43	114	63	0 52
21	29 Ceti	6½	20 1	9 58	322	272	20 58	10 54	96	49	0 56
21	33 Ceti	6	21 37	11 34	335	290	22 36	12 32	91	54	0 59
21	35 Ceti	6½	22 29	12 26	281	242	23 37	13 33	152	125	1 7
21	f Piscium	6	2 34	16 30	308	333	3 49	17 45	122	162	1 15
28	52 Geminor.	6	0 25	13 53	281	231	1 23	14 51	92	37	0 58
Sept. 15	♊ Aquarii	4	17 57	6 16	9	321	18 8	6 27	30	343	0 11
19	B. A. C. 728	6½	19 47	7 50	25	335	Star 2/5 north of	♏'s	limb.		
19	♈ Arietis	5½	20 15	8 18	255	203	20 56	8 59	161	109	0 41
19	31 Arietis	5½	3 45	15 47	263	202	4 48	16 50	156	199	1 4
21	♉ Tauri	6	21 23	9 17	202	152	Star 2/3 north of	♏'s	limb.		
21	♉ Tauri	5½	1 15	13 9	250	197	2 9	14 3	164	117	0 53
21	53 Tauri	6½	2 54	14 48	318	279	4 13	16 7	94	95	1 20
24	37 Geminor.	6	0 32	12 14	300	247	1 28	13 10	78	21	0 56
Oct. 11	B. A. C. 7550	6	1 43	12 19	255	208	2 27	13 3	158	206	0 44
15	29 Ceti	6½	19 30	5 50	290	239	20 28	6 49	128	79	0 59
15	33 Ceti	6	20 57	7 17	305	257	22 3	8 23	121	78	1 6
15	35 Ceti	6½	22 6	8 26	243	201	22 39	9 0	188	151	0 34
15	f Piscium	6	1 52	12 12	279	293	2 59	13 19	154	185	1 8
18	B. A. C. 1242	6	7 9	17 17	305	359	8 18	18 25	84	140	1 8
20	121 Tauri	6	23 10	9 11	196	144	Star 4/4 north of	♏'s	limb.		
22	A Geminor.†	5½	23 19	9 11	268	224	0 11	10 3	101	52	0 52
25	♌ Leonis	3½	6 25	16 4	225	172	7 39	17 18	95	48	1 14
Nov. 7	33 Capricor.†	6	1 19	10 8	328	11	2 10	10 59	83	131	0 51
10	30 Piscium	5	21 55	6 33	280	251	23 5	7 43	152	138	1 10
13	31 Arietis	5½	0 52	9 18	291	257	2 9	10 35	140	131	1 17
14	B. A. C. 1096	6½	5 12	13 33	226	267	5 43	14 5	180	227	0 31
15	♉ Tauri	5½	22 43	7 1	250	196	22 26	7 44	159	103	0 43
15	53 Tauri	6½	0 0	8 18	324	268	0 59	9 17	88	33	0 59
15	B. A. C. 1373	6	5 44	14 1	204	244	5 53	14 11	191	234	0 9
Dec. 10	B. A. C. 728	6½	3 43	10 23	212	243	Star 4/2 south of	♏'s	limb.		
12	B. A. C. 1242	6	2 6	8 38	29	344	Star 0/1 north of	♏'s	limb.		
15	40 Geminor.	6½	11 18	17 37	349	48	Star 3/5 north of	♏'s	limb.		
19	42 Leonis	6	12 24	18 27	146	190	Star 3/0 south of	♏'s	limb.		
21	♎ Virginis	4½	6 46	12 42	210	158	7 44	13 39	98	48	0 58
24	96 Virginis	6½	11 38	17 21	323	291	Star 1/2 north of	♏'s	limb.		
26	λ Libræ	6	11 10	16 45	278	231	12 1	17 36	28	346	0 51

\* Whole occultation below the horizon of Washington.

† Immersion below the horizon of Washington.

‡ Emersion below the horizon of Washington.

The Angles of Position, for the points of contact, are for direct vision, and are reckoned from the Moon's North Point towards the West, and from its Vertex in the same direction. For inverted image, add 180° to the angles given.

## ELEMENTS FOR FACILITATING THE PREDICTION OF OCCULTATIONS OF PLANETS AND STARS BY THE MOON.

JANUARY.

STAR'S—				AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1872.0. $\Delta\alpha$ $\Delta\delta$	Apparent Declination.	Washington Mean Time.	Hour Angle. $H$	$Y$	$x'$	$y'$	N'n.	S'n.
$\epsilon$ Leonis, <i>mult.</i>	4	-0.51 + 1.4	+11.14.1	$\begin{smallmatrix} d & h & m \\ 1 & 2 & 47.4 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ +10 & 13.3 \end{smallmatrix}$	-1.0134	.5173	-2156	-16	-79
$\omega$ Virginis	6 $\frac{1}{2}$	0.59 2.0	8 50.6	$\begin{smallmatrix} d & h & m \\ 10 & 17.6 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ -6 & 29.9 \end{smallmatrix}$	-0.0776	.5167	.2217	+37	-43
$\xi$ Virginis	5	0.62 1.9	8 58.2	$\begin{smallmatrix} d & h & m \\ 13 & 48.1 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ -3 & 5.5 \end{smallmatrix}$	-0.9961	.5164	.2244	-15	-81
$\nu$ Virginis	4 $\frac{1}{2}$	0.63 2.5	7 14.8	$\begin{smallmatrix} d & h & m \\ 14 & 6.6 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ -2 & 47.6 \end{smallmatrix}$	+0.7832	.5164	.2245	+90	+3
$\Lambda$ Virginis	5 $\frac{1}{2}$	0.63 1.9	8 57.4	$\begin{smallmatrix} d & h & m \\ 15 & 10.3 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ -1 & 45.9 \end{smallmatrix}$	-1.2885	.5162	.2252	-40	-81
$\pi$ Virginis	4 $\frac{1}{2}$	0.70 2.3	7 19.7	$\begin{smallmatrix} d & h & m \\ 21 & 50.5 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ +4 & 42.4 \end{smallmatrix}$	-1.0593	.5164	.2296	-19	-83
11 Virginis	6	-0.75 + 2.5	+ 6 31.2	$\begin{smallmatrix} d & h & m \\ 2 & 2 & 34.7 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ +9 & 18.2 \end{smallmatrix}$	-1.2880	.5166	-.2323	-39	-84
B. A. C. 4104	6 $\frac{1}{2}$	0.76 2.9	4 46.1	$\begin{smallmatrix} d & h & m \\ 3 & 23.5 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ +10 & 5.6 \end{smallmatrix}$	+0.3907	.5168	.2328	+64	-20
$c$ Virginis	5	0.81 3.3	4 1.6	$\begin{smallmatrix} d & h & m \\ 7 & 52.2 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ -9 & 33.7 \end{smallmatrix}$	+0.1317	.5171	.2348	+48	-33
B. A. C. 4254	6	0.90 3.6	+ 2 33.6	$\begin{smallmatrix} d & h & m \\ 17 & 3.8 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ -0 & 38.6 \end{smallmatrix}$	-0.4884	.5188	.2382	+15	-71
65 Virginis	6	1.16 5.3	- 4 15.2	$\begin{smallmatrix} d & h & m \\ 3 & 15 & 35.7 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ -2 & 47.8 \end{smallmatrix}$	+1.2471	.5263	.2407	+86	+34
66 Virginis	6	1.17 5.4	4 29.6	$\begin{smallmatrix} d & h & m \\ 16 & 11.6 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ -2 & 13.1 \end{smallmatrix}$	+1.3530	.5265	.2407	+86	+48
90 Virginis	6	-1.23 + 5.2	- 4 44.5	$\begin{smallmatrix} d & h & m \\ 21 & 35.2 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ +3 & 0.4 \end{smallmatrix}$	+0.3148	.5293	-.2398	+58	-24
B. A. C. 4572	6	1.28 5.1	4 51.1	$\begin{smallmatrix} d & h & m \\ 4 & 1 & 40.0 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ +6 & 57.6 \end{smallmatrix}$	-0.5474	.5314	.2387	+11	-75
B. A. C. 4647	6	1.35 5.8	7 25.6	$\begin{smallmatrix} d & h & m \\ 6 & 59.0 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ -11 & 53.6 \end{smallmatrix}$	+0.8488	.5344	.2370	+83	+5
94 Virginis	6	1.41 5.7	8 16.7	$\begin{smallmatrix} d & h & m \\ 12 & 20.9 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ -6 & 42.0 \end{smallmatrix}$	+0.4598	.5378	.2345	+67	-16
95 Virginis	6	1.42 5.9	8 42.0	$\begin{smallmatrix} d & h & m \\ 12 & 33.0 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ -6 & 30.3 \end{smallmatrix}$	+0.8455	.5382	.2344	+82	+5
$\kappa$ Virginis	4 $\frac{1}{2}$	1.46 6.1	9 40.5	$\begin{smallmatrix} d & h & m \\ 15 & 26.3 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ -3 & 42.7 \end{smallmatrix}$	+1.1730	.5404	.2328	+81	+28
$\alpha$ Libræ	6	-1.84 + 5.6	-15 5.0	$\begin{smallmatrix} d & h & m \\ 5 & 21 & 56.7 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ +1 & 44.9 \end{smallmatrix}$	-0.0582	.5653	-.2037	+31	-44
$\alpha$ Libræ	6	1.84 5.5	14 40.4	$\begin{smallmatrix} d & h & m \\ 22 & 48.9 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ +2 & 35.3 \end{smallmatrix}$	-0.6461	.5662	.2024	0	-87
$\gamma$ Libræ	4	1.86 5.7	16 16.0	$\begin{smallmatrix} d & h & m \\ 6 & 1 & 0.9 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ +4 & 42.4 \end{smallmatrix}$	+0.5143	.5681	.1994	+64	-13
$\delta$ Libræ	7	1.86 5.6	16 59.7	$\begin{smallmatrix} d & h & m \\ 1 & 34.1 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ +5 & 14.5 \end{smallmatrix}$	+1.1363	.5687	.1985	+73	+27
B. A. C. 5099	7	1.86 5.6	16 48.6	$\begin{smallmatrix} d & h & m \\ 1 & 49.5 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ +5 & 29.3 \end{smallmatrix}$	+0.8989	.5690	.1981	+73	+10
$\zeta$ Libræ	6	1.87 5.6	16 10.0	$\begin{smallmatrix} d & h & m \\ 2 & 2.4 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ +5 & 42.7 \end{smallmatrix}$	+0.2105	.5691	.1978	+45	-30
$\zeta$ Libræ	6	-1.87 + 5.4	-16 24.9	$\begin{smallmatrix} d & h & m \\ 2 & 59.3 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ +6 & 36.5 \end{smallmatrix}$	+0.2724	.5699	-.1964	+48	-26
$\beta$ Scorpii	2	2.07 4.7	19 27.1	$\begin{smallmatrix} d & h & m \\ 16 & 21.3 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ -4 & 31.6 \end{smallmatrix}$	+0.8264	.5824	.1739	+71	+6
$\beta$ Scorpii	5 $\frac{1}{2}$	2.07 4.7	19 26.9	$\begin{smallmatrix} d & h & m \\ 16 & 21.4 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ -4 & 31.5 \end{smallmatrix}$	+0.8230	.5824	.1739	+71	+6
$\nu$ Venus			17 59.7	$\begin{smallmatrix} d & h & m \\ 18 & 14.1 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ -2 & 43.1 \end{smallmatrix}$	-0.9456	.5405	.1591	-22	-90
$\nu$ Scorpii	7	2.11 4.2	19 6.9	$\begin{smallmatrix} d & h & m \\ 18 & 59.7 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ -1 & 59.3 \end{smallmatrix}$	+0.0390	.5852	.1685	+32	-39
$\nu$ Scorpii	4	2.11 4.2	19 7.5	$\begin{smallmatrix} d & h & m \\ 19 & 0.1 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ -1 & 58.9 \end{smallmatrix}$	+0.0472	.5852	.1685	+33	-38
B. A. C. 5408	6 $\frac{1}{2}$	-2.11 + 4.2	-18 12.0	$\begin{smallmatrix} d & h & m \\ 20 & 5.4 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ -0 & 56.1 \end{smallmatrix}$	-1.0537	.5863	-.1664	-30	-90
$\psi$ Ophiuchi	5	2.17 4.0	19 44.1	$\begin{smallmatrix} d & h & m \\ 23 & 48.4 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ +2 & 38.1 \end{smallmatrix}$	-0.1325	.5897	.1587	+22	-49
$\omega$ Ophiuchi	5	2.23 3.9	21 11.3	$\begin{smallmatrix} d & h & m \\ 7 & 2 & 55.9 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ +5 & 38.2 \end{smallmatrix}$	+0.8249	.5926	.1519	+69	+6
B. A. C. 5580	6	2.24 3.1	19 40.6	$\begin{smallmatrix} d & h & m \\ 6 & 45.4 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ +9 & 8.5 \end{smallmatrix}$	-1.2357	.5961	.1431	-50	-90
24 Ophiuchi	6 $\frac{1}{2}$	2.33 2.8	22 56.6	$\begin{smallmatrix} d & h & m \\ 12 & 25.0 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ -9 & 15.7 \end{smallmatrix}$	+1.2201	.6012	.1292	+67	+41
B. A. C. 5758	6	2.35 2.0	21 23.0	$\begin{smallmatrix} d & h & m \\ 16 & 0.7 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ -5 & 48.8 \end{smallmatrix}$	-0.7691	.6038	.1205	-16	-90
B. A. C. 5831	6	-2.40 + 2.0	-23 55.7	$\begin{smallmatrix} d & h & m \\ 20 & 25.4 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ -1 & 35.2 \end{smallmatrix}$	+1.2328	.6059	-.1111	+66	+44
$b$ Ophiuchi	5	2.43 1.6	24 3.2	$\begin{smallmatrix} d & h & m \\ 23 & 30.0 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ +1 & 21.6 \end{smallmatrix}$	+1.0320	.6095	.1002	+66	+22
$c$ Ophiuchi	5	2.45 + 1.3	23 51.6	$\begin{smallmatrix} d & h & m \\ 8 & 1 & 22.3 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ +3 & 9.2 \end{smallmatrix}$	+0.6580	.6108	-.0948	+63	-4
$\phi$ Capricorni	6	2.22 -10.8	21 11.0	$\begin{smallmatrix} d & h & m \\ 11 & 11 & 18.7 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ +9 & 34.3 \end{smallmatrix}$	+0.4206	.5972	+1.460	+52	-18
33 Capricorni	6	2.20 11.2	21 23.8	$\begin{smallmatrix} d & h & m \\ 14 & 38.2 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ -11 & 14.1 \end{smallmatrix}$	+1.1314	.5939	.1539	+69	+29
37 Capricorni	6	2.15 11.4	20 39.4	$\begin{smallmatrix} d & h & m \\ 18 & 52.2 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ -7 & 10.2 \end{smallmatrix}$	+1.0718	.5902	.1630	+70	+24
$\epsilon$ Capricorni	4 $\frac{1}{2}$	-2.13 -11.7	-20 2.5	$\begin{smallmatrix} d & h & m \\ 19 & 45.7 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ -6 & 18.9 \end{smallmatrix}$	+0.6076	.5893	+1.648	+65	-7
$\kappa$ Capricorni	5	2.12 11.8	19 27.1	$\begin{smallmatrix} d & h & m \\ 21 & 59.4 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ -4 & 10.3 \end{smallmatrix}$	+0.3951	.5874	.1692	+52	-19
B. A. C. 7550	6	2.13 11.9	20 12.5	$\begin{smallmatrix} d & h & m \\ 22 & 12.6 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ -3 & 57.7 \end{smallmatrix}$	+1.1855	.5874	.1696	+70	+34
29 Aqua., <i>mult.</i>	6	2.01 12.2	17 35.0	$\begin{smallmatrix} d & h & m \\ 12 & 6 & 3.5 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ +3 & 35.1 \end{smallmatrix}$	-0.0357	.5797	.1844	+30	-43
56 Aquarii	6	1.87 12.5	15 14.5	$\begin{smallmatrix} d & h & m \\ 17 & 45.5 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ -9 & 8.9 \end{smallmatrix}$	-0.1075	.5682	.2030	+29	-47
$\gamma$ Aqua., <i>mult.</i>	6	1.78 12.7	14 44.0	$\begin{smallmatrix} d & h & m \\ 13 & 1 & 18.0 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ -1 & 52.6 \end{smallmatrix}$	+0.9508	.5620	.2123	+75	+13
$\gamma$ Aquarii	4	-1.77 -12.7	-14 16.2	$\begin{smallmatrix} d & h & m \\ 2 & 7.8 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ -1 & 4.6 \end{smallmatrix}$	+0.6608	.5608	+2.138	+75	-5
74 Aquarii	6	1.75 12.1	12 18.0	$\begin{smallmatrix} d & h & m \\ 3 & 51.2 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ +0 & 35.1 \end{smallmatrix}$	-0.9621	.5591	.2157	-17	-90
$\psi$ Aquarii	4 $\frac{1}{2}$	1.63 11.6	9 47.3	$\begin{smallmatrix} d & h & m \\ 13 & 53.0 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ +10 & 16.1 \end{smallmatrix}$	-1.3017	.5503	.2254	-45	-90
$\phi$ Aquarii	4 $\frac{1}{2}$	1.61 11.7	9 53.1	$\begin{smallmatrix} d & h & m \\ 14 & 49.6 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ +11 & 10.8 \end{smallmatrix}$	-0.9915	.5495	.2263	-18	-90
$\psi$ Aquarii	5	1.61 11.8	10 18.8	$\begin{smallmatrix} d & h & m \\ 15 & 18.2 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ +11 & 38.4 \end{smallmatrix}$	-0.4471	.5493	.2265	+14	-68
B. A. C. 8214	6 $\frac{1}{2}$	-1.52 -11.3	- 8 10.6	$\begin{smallmatrix} d & h & m \\ 22 & 57.7 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ -4 & 57.4 \end{smallmatrix}$	-0.8764	.5433	+2.322	- 9	-90

ELEMENTS FOR FACILITATING THE PREDICTION OF OCCULTATIONS OF  
PLANETS AND STARS BY THE MOON.

JANUARY.

STAR'S—				AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'n's from 1872.0. $\Delta\alpha$ $\Delta\delta$	Apparent Declination.	Washington Mean Time.	Hour Angle. $H$	$Y$	$x'$	$y'$	N'n.	S'n.
B. A. C. 8274	6 $\frac{1}{2}$	-1.46	-11.0	-7 5.7	14 5 5.0	+0 57.8	-0.5577	.5388	+2356	+10 -76
30 Piscium	5	1.39	11.0	6 43.7	11 29.4	+7 9.8	+0.5833	.5342	.2382	+76 -10
33 Piscium	5	1.37	10.9	6 25.6	13 7.3	+8 44.6	+0.6616	.5333	.2387	+82 -6
B. A. C. 17	6 $\frac{1}{2}$	1.34	10.9	5 57.8	15 31.9	+11 4.6	+0.7579	.5316	.2393	+80 0
B. A. C. 81	6 $\frac{1}{2}$	1.27	9.9	2 55.8	22 27.8	-6 12.5	-0.7283	.5277	.2406	+2 -90
14 Ceti	6 $\frac{1}{2}$	1.22	9.1	1 12.7	15 3 55.1	-0 55.3	-1.2089	.5249	.2410	-31 -90
15 Ceti	6 $\frac{1}{2}$	-1.21	-9.0	-1 12.6	5 11.5	+0 18.7	-0.9055	.5245	+2410	-8 -90
26 Ceti, <i>mult.</i>	6 $\frac{1}{2}$	1.06	8.2	+0 40.7	18 7.6	-11 8.8	+0.2182	.5194	.2394	+53 -29
29 Ceti	6 $\frac{1}{2}$	1.03	8.9	1 19.2	20 14.7	-9 5.5	+0.0459	.5188	.2390	+43 -39
33 Ceti	6	1.03	7.7	1 45.7	21 33.5	-7 49.0	-0.1070	.5182	.2385	+35 -47
35 Ceti	6 $\frac{1}{2}$	1.03	7.7	1 47.5	22 33.9	-6 20.4	+0.1006	.5182	.2382	+46 -35
f Piscium	6	0.99	7.3	2 56.3	16 1 15.0	-4 14.2	-0.4746	.5174	.2374	+16 -70
B. A. C. 408	6 $\frac{1}{2}$	-0.97	-7.0	+4 4.0	3 45.4	-1 45.2	-1.0787	.5169	+2365	-20 -86
v Piscium	4 $\frac{1}{2}$	0.88	6.3	4 50.2	13 22.3	+7 31.6	+0.3521	.5149	.2319	+61 -22
64 Ceti	6 $\frac{1}{2}$	0.73	4.9	7 58.0	17 4 48.7	-1 29.3	+0.5068	.5140	.2221	+73 -12
g Ceti	4 $\frac{1}{2}$	0.73	4.8	8 14.6	5 39.0	-0 40.5	+0.3965	.5140	.2214	+65 -18
B. A. C. 728	6 $\frac{1}{2}$	0.69	3.8	10 15.1	10 23.8	+3 55.9	-0.7284	.5142	.2175	+2 -79
B. A. C. 741	6 $\frac{1}{2}$	0.67	4.2	9 7.9	11 35.3	+5 5.3	+0.7405	.5143	.2167	+90 +1
$\xi$ Arietis	5 $\frac{1}{2}$	-0.67	-3.9	+10 1.7	11 44.3	+5 14.1	-0.1943	.5143	+2166	+30 -49
B. A. C. 755	6	0.66	3.8	9 59.2	12 44.3	+6 12.2	+0.0648	.5143	.2157	+44 -35
31 Arietis	5 $\frac{1}{2}$	0.61	3.2	11 53.4	17 47.0	+11 6.1	-0.9228	.5147	.2112	-10 -78
38 Arietis	5	0.57	3.0	11 54.3	22 5.2	-8 43.4	-0.0386	.5152	.2072	+39 -39
B. A. C. 1096	6 $\frac{1}{2}$	0.35	0.4	17 24.6	18 23 3.0	-8 34.3	-1.2269	.5209	.1785	-37 -73
B. A. C. 1119	6	0.33	0.8	16 7.1	19 1 45.3	-5 56.9	+0.6697	.5218	.1748	+90 +3
B. A. C. 1206	6	-0.25	-0.6	+16 56.6	8 36.6	+0 41.8	+0.9298	.5241	+1652	+90 +19
B. A. C. 1240	6	0.23	-0.1	17 49.9	12 23.8	+4 22.1	+0.5696	.5253	.1596	+79 -1
$\omega$ Tauri	6	0.17	+0.3	19 16.1	16 30.2	+8 20.9	-0.3716	.5266	.1534	+20 -51
$\omega$ Tauri	5 $\frac{1}{2}$	-0.13	0.6	20 15.7	20 28.9	-11 47.8	-0.8694	.5280	.1472	-9 -70
i Tauri	5	+0.08	1.1	21 24.3	20 18 40.6	+9 41.9	+0.7233	.5362	.1091	+90 +13
105 Tauri	6	0.10	1.1	21 32.0	20 59.2	+11 59.9	+0.8270	.5369	.1050	+90 +20
$\pi$ Tauri	6	+0.13	+1.3	+21 57.7	21 2 22.5	-6 47.1	+0.8904	.5389	+0945	+90 +25
121 Tauri	6	0.21	1.7	23 57.1	9 57.9	+0 33.4	-0.6545	.5411	.0803	+3 -62
B. A. C. 1774	6 $\frac{1}{2}$	0.23	1.6	23 14.9	11 46.2	+2 18.2	+0.2694	.5417	.0762	+57 -8
B. A. C. 1801	6	0.25	1.5	23 8.5	13 41.1	+4 9.3	+0.5292	.5422	.0723	+77 +6
132 Tauri	5 $\frac{1}{2}$	0.27	1.8	24 31.3	16 18.9	+6 41.9	-0.8209	.5430	.0673	-7 -66
1 Geminorum	5	0.32	1.4	23 16.1	23 23.8	-10 27.2	+0.9963	.5449	.0522	+90 +36
2 Geminorum	6 $\frac{1}{2}$	+0.33	+1.5	+23 38.9	22 0 38.3	-9 15.2	+0.6375	.5451	+0497	+90 +14
5 Geminorum	6	0.35	1.6	24 26.8	2 48.7	-7 9.1	-0.1454	.5455	.0452	+32 -27
B. A. C. 2154	6 $\frac{1}{2}$	0.43	1.4	24 41.7	14 47.9	+4 26.2	-0.0315	.5478	.0195	+39 -18
e Geminorum	3 $\frac{1}{2}$	0.46	1.4	25 15.3	17 46.1	+7 18.4	-0.6077	.5479	.0131	+6 -54
B. A. C. 2238	6	0.47	1.0	23 45.1	21 32.1	+10 56.8	+1.0972	.5483	.0047	+90 +48
37 Geminorum	6	0.48	1.2	25 32.1	23 0.4	-11 37.8	-0.8774	.5485	+0018	-11 -65
$\omega$ Geminorum	6	+0.50	+1.0	+24 23.8	23 2 18.3	-8 26.5	+0.3798	.5487	-0046	+65 +5
48 Geminor.	6	0.52	0.8	24 20.4	6 55.4	-3 58.7	+0.3916	.5487	.0156	+66 +5
52 Geminor.	6	0.53	0.9	25 6.2	7 56.2	-2 59.9	-0.4717	.5488	.0178	+14 -44
A Geminorum	5 $\frac{1}{2}$	0.55	0.8	25 17.7	11 58.9	+0 54.6	-0.7736	.5488	.0266	-4 -65
B. A. C. 2514	6 $\frac{1}{2}$	0.57	0.4	24 30.6	19 14.8	+7 55.9	-0.1531	.5484	.0422	+32 -27
$\kappa$ Gemi., <i>mult.</i>	3 $\frac{1}{2}$	0.58	+0.3	24 42.1	21 40.1	+10 16.3	-0.4765	.5482	.0477	+14 -48
$\mu$ Cancri	6	+0.60	-0.2	+22 59.9	24 7 50.1	-3 54.0	+0.8168	.5466	-0691	+90 +23
$\lambda$ Cancri	6	0.62	0.4	24 25.4	14 25.9	+2 23.7	-1.2604	.5454	.0830	-51 -66
$\gamma$ Cancri	4 $\frac{1}{2}$	0.61	0.9	21 55.6	25 1 10.2	-11 8.2	+0.4931	.5429	.1041	+74 +2
B. A. C. 3138	6	0.60	1.5	21 48.5	15 35.4	+2 48.9	-1.0755	.5384	.1312	-25 -68
$\eta$ Leonis	3 $\frac{1}{2}$	0.50	2.5	17 23.1	26 17 48.8	+4 12.6	-0.2277	.5295	.1733	+28 -45
42 Leonis	6	+0.46	-2.4	+15 37.1	27 1 2.8	+11 13.2	+0.4108	.5270	-1831	+67 -12

## ELEMENTS FOR FACILITATING THE PREDICTION OF OCCULTATIONS OF PLANETS AND STARS BY THE MOON.

### JANUARY.

STAR'S—				AT CONJUNCTION IN R. A.							Limiting Parallels.	
Name.	Mag.	Red'ns from 1872.0. $\Delta\alpha$	$\Delta\delta$	Apparent Declination.	Washington Mean Time.	Hour Angle. $H$	$Y$	$x'$	$y'$	N'n.	S'n.	
B. A. C. 3579	6	+0.45	- 2.4	+14 59.7	<sup>d</sup> 27 <sup>h</sup> 4 <sup>m</sup> 32.7	- 9 23.4	+0.4433	.5261	-1878	+69	-11	
i Leonis	6	0.45	2.4	14 47.6	6 14.6	- 7 44.6	+0.3447	.5255	.1899	+61	-17	
k Leonis	6	0.41	2.7	14 52.1	13 25.0	- 0 47.2	-1.1316	.5231	.1984	-26	-75	
i Leonis, mult.	4	0.27	2.5	11 14.0	28 8 33.2	- 6 13.5	-1.1698	.5187	.2173	-28	-79	
o Virginis	6½	0.21	2.3	8 50.5	16 3.7	+ 1 3.6	-0.2400	.5175	.2231	+20	-51	
ξ Virginis	5	0.20	2.6	8 58.1	19 34.8	+ 4 28.4	-1.1655	.5169	.2256	-27	-81	
ν Virginis	4½	+0.20	- 2.3	+ 7 14.7	19 53.2	+ 4 46.3	+0.6193	.5168	-.2258	+82	- 7	
π Virginis	4½	0.13	2.5	7 19.6	29 3 38.7	-11 41.9	-1.2379	.5162	.2305	-34	-83	
B. A. C. 4104	6½	0.08	2.0	4 46.0	9 13.7	- 6 16.8	+0.2136	.5161	.2333	+53	-29	
c Virginis	5	+0.04	1.8	4 1.5	13 44.3	- 1 54.2	-0.0502	.5159	.2351	+38	-43	
B. A. C. 4254	6	-0.05	1.7	+ 2 33.5	23 1.1	+ 7 6.1	-0.6809	.5187	.2380	+ 5	-87	
65 Virginis	6	0.27	0.3	- 4 15.3	30 21 53.2	+ 5 17.1	+1.0607	.5219	.2390	+86	+19	
66 Virginis	6	-0.27	- 0.3	- 4 29.7	22 30.7	+ 5 53.5	+1.1676	.5219	-.2389	+86	+27	
80 Virginis	6	0.34	0.2	4 44.6	31 3 59.8	+11 12.5	+0.1178	.5238	.2377	+47	-35	
B. A. C. 4572	6	0.42	- 0.4	4 51.2	8 10.0	- 8 44.9	-0.7549	.5256	.2364	0	-90	
B. A. C. 4647	6	0.49	+0.3	7 25.6	13 36.5	- 3 28.6	+0.6589	.5283	.2344	+82	- 6	
94 Virginis	6	0.52	0.4	8 16.8	19 6.6	+ 1 51.2	+0.2656	.5310	.2315	+54	-27	
95 Virginis	6	0.52	0.6	8 42.1	19 19.0	+ 2 3.3	+0.6567	.5311	.2315	+80	- 6	
κ Virginis	4½	-0.54	+ 0.9	- 9 40.6	22 17.0	+ 4 55.6	+0.9895	.5327	-.2297	+81	+16	

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2 Libræ	6	-0.60	+1.1	-11 7.7	1 3 18.5	+ 9 47.5	+1.3480	.5357	-.2264	+79	+50
μ Libræ	5	0.77	1.4	13 36.8	15 25.5	- 2 29.3	+1.2300	.5440	.2160	+77	+35
o¹ Libræ	6	0.95	1.3	15 5.1	2 5 45.2	+11 21.1	-0.2427	.5550	.1994	+22	-55
o² Libræ	6	0.97	1.2	14 40.5	6 39.1	-11 46.9	-0.8400	.5559	.1982	-11	-90
ζ Libræ	4	0.99	1.6	16 16.1	8 55.7	- 9 35.0	+0.3422	.5576	.1950	+53	-22
ζ² Libræ	7	1.00	1.5	16 59.8	9 30.2	- 9 1.7	+0.9752	.5582	.1942	+73	+15
B. A. C. 5099	7	-1.00	+1.5	-16 48.7	9 46.1	- 8 46.3	+0.7342	.5583	-.1938	+73	- 1
ζ³ Libræ	6	1.01	1.5	16 10.1	9 59.1	- 8 33.8	+0.0355	.5586	.1936	+36	-39
ζ⁴ Libræ	6	1.02	1.5	16 25.0	10 58.4	- 7 36.7	+0.0979	.5592	.1921	+39	-35
β¹ Scorpii	2	1.19	1.5	19 27.2	3 0 49.8	+ 5 44.7	+0.6756	.5712	.1863	+70	- 5
β² Scorpii	5½	1.19	1.5	19 26.9	0 49.9	+ 5 44.8	+0.6724	.5712	.1863	+69	- 4
ν¹ Scorpii	7	1.23	1.9	19 7.0	3 34.1	+ 8 22.9	-0.1228	.5740	.1643	+24	-48
ν² Scorpii	4	-1.23	+1.9	-19 7.5	3 34.5	+ 8 23.3	-0.1118	.5740	-.1643	+24	-47
B. A. C. 5408	6½	1.24	0.8	18 12.1	4 42.2	+ 9 28.4	-1.2337	.5749	.1621	+47	-90
ψ Ophiuchi	5	1.30	0.9	19 44.1	8 33.6	-10 48.8	-0.2915	.5782	.1545	-14	-58
ω Ophiuchi	5	1.35	1.3	21 11.4	11 48.1	- 7 41.7	+0.6869	.5809	.1478	+68	- 3
24 Ophiuchi	6½	1.49	0.9	22 56.6	21 38.1	+ 1 45.4	+1.1013	.5898	.1260	+67	+27
B. A. C. 5758	6	1.53	0.1	21 23.0	4 1 21.7	+ 5 20.2	-0.9171	.5920	.1167	-25	-90
B. A. C. 5831	6	-1.60	+0.4	-23 55.8	5 56.0	+ 9 43.4	+1.1238	.5958	-.1054	+66	+30
δ Ophiuchi	5	1.64	0.0	24 3.3	9 6.8	-11 13.5	+0.9255	.5979	.0972	+66	+14
ε Ophiuchi	5	1.68	-0.1	23 51.7	11 3.1	- 9 21.9	+0.5483	.5994	.0921	+55	-10
63 Ophiuchi	6½	1.76	0.8	24 51.6	19 55.3	- 0 51.7	+0.8348	.6052	.0676	+65	+ 8
4 Sagittarii	5	1.76	1.4	23 48.1	21 46.7	+ 0 55.1	-0.3405	.6060	.0623	+ 9	-62
7 Sagittarii	6	1.79	1.3	24 16.8	22 54.6	+ 2 0.1	+0.0658	.6067	.0591	+23	-37
9 Sagittarii	4½	-1.80	-1.4	-24 21.7	23 17.5	+ 2 22.0	+0.1246	.6069	-.0580	+26	-34
B. A. C. 6161	6	1.80	1.9	23 43.5	2 13.7	+ 5 10.8	-0.6653	.6084	.0489	-17	-90
B. A. C. 6217	6½	1.86	1.9	24 58.4	5 50.2	+ 8 38.2	+0.4117	.6100	.0387	+43	-18
λ Sagittarii	3	1.89	2.1	25 29.4	8 12.6	+10 54.6	+0.8453	.6111	.0316	+65	+10
24 Sagittarii	6	1.89	2.7	24 7.5	10 25.2	-10 58.4	-0.5707	.6118	.0246	-13	-82
B. A. C. 6343	6	1.91	3.0	23 36.8	12 7.8	- 9 20.3	-1.1169	.6121	.0199	-49	-90
26 Sagittarii	6	-1.92	-3.1	-23 57.1	13 21.1	- 8 10.1	-0.8028	.6123	-.0164	-27	-90
B. A. C. 6369	6	1.94	2.9	25 8.5	14 25.0	- 7 8.9	+0.3605	.6129	-.0124	+36	-20
B. A. C. 6490	6½	-1.98	-4.0	-25 1.5	20 52.8	- 0 57.7	+0.2258	.6142	+0.071	+28	-28

ELEMENTS FOR FACILITATING THE PREDICTION OF OCCULTATIONS OF  
PLANETS AND STARS BY THE MOON.

FEBRUARY.

STAR'S—				AT CONJUNCTION IN R. A.						Limiting Parallels.	
Name.	Mag.	Red'ns from 1872.0. $\Delta\alpha$ $\Delta\delta$		Apparent Declination.	Washington Mean Time.	Hour Angle $H$	$Y$	$x'$	$y'$	N'n.	S'n.
$\psi$ Sagittarii	5	-2.01	- 4.4	-25 28.6	6 1 39.0	+ 3 36.2	+0.7401	.6145	+0.0220	+65	+ 2
B. A. C. 6576	6	1.99	4.8	24 23.8	1 40.3	+ 3 37.5	-0.3230	.6145	.0221	0	-61
$\chi^1$ Sagittarii	6	2.02	5.1	24 45.4	5 13.4	+ 7 0.4	+0.1277	.6145	.0325	+24	-34
$\chi^2$ Sagittarii	6 $\frac{1}{2}$	2.02	5.1	24 39.8	5 15.9	+ 7 3.8	+0.0381	.6145	.0327	+19	-39
$\chi^3$ Sagittarii	6	2.01	5.2	24 12.7	5 19.2	+ 7 7.0	-0.4064	.6145	.0328	- 4	-67
B. A. C. 6690	6 $\frac{1}{2}$	2.03	5.8	23 35.3	9 2.8	+10 41.0	-0.8772	.6142	.0445	-30	-90
$\lambda^1$ Sagittarii	6	-2.03	- 5.8	-24 59.9	9 9.5	+10 47.4	+0.5199	.6140	+0.0447	+49	-10
$\lambda^2$ Sagittarii	4 $\frac{1}{2}$	2.03	5.8	25 9.9	9 24.0	+11 1.3	+0.6950	.6139	.0460	+63	- 1
53 Sagittarii	6	2.05	6.0	23 43.0	10 34.7	-11 51.0	-0.6783	.6139	.0495	-17	-93
B. A. C. 6727	6 $\frac{1}{2}$	2.05	6.1	23 43.2	10 41.0	-11 45.0	-0.6700	.6139	.0497	-17	-90
B. A. C. 6864	6	2.08	6.5	23 5.3	18 31.4	- 4 14.7	-0.8108	.6119	.0733	-23	-90
B. A. C. 6878	6 $\frac{1}{2}$	2.09	6.6	22 57.2	19 23.5	- 3 24.8	-0.8762	.6117	.0759	-27	-90
$\psi^1$ Aquarii	4 $\frac{1}{2}$	-1.70	-12.0	- 9 47.3	10 0 35.9	- 1 12.9	-1.1497	.5568	+2301	-29	-90
$\psi^2$ Aquarii	4 $\frac{1}{2}$	1.70	12.0	9 53.1	1 31.2	- 0 19.4	-0.8404	.5564	.2310	- 8	-90
$\psi^3$ Aquarii	5	1.70	12.0	10 18.8	1 32.5	- 0 18.2	-0.4032	.5564	.2310	+17	-65
B. A. C. 8214	6 $\frac{1}{2}$	1.67	11.9	8 10.6	9 28.4	+ 7 21.4	-0.7096	.5504	.2371	+ 1	-90
B. A. C. 8274	6 $\frac{1}{2}$	1.63	11.9	7 5.7	15 26.8	-10 52.2	-0.3826	.5463	.2406	+19	-63
30 Piscium	5	1.59	11.8	6 43.7	21 41.4	- 4 50.0	+0.7560	.5423	.2433	+80	0
33 Piscium	5	-1.57	-11.7	- 6 25.6	23 16.7	- 3 17.9	+0.8362	.5415	+2438	+84	+ 4
B. A. C. 17	6 $\frac{1}{2}$	1.56	11.6	5 57.8	11 1 37.4	- 1 1.7	+0.9350	.5399	.2445	+84	+10
B. A. C. 81	6 $\frac{1}{2}$	1.50	10.8	2 55.8	8 21.9	+ 5 29.7	-0.5220	.5360	.2458	+13	-73
14 Ceti	6 $\frac{1}{2}$	1.48	10.4	1 12.7	13 40.0	+10 37.6	-0.9883	.5335	.2461	+14	-90
15 Ceti	6 $\frac{1}{2}$	1.47	10.3	- 1 12.6	14 54.1	+11 49.4	-0.6869	.5330	.2462	+ 5	-89
26 Ceti, <i>mult.</i>	6 $\frac{1}{2}$	1.37	9.6	+ 0 40.6	12 3 27.8	- 0 0.6	+0.4385	.5277	.2443	+67	-18
29 Ceti	6 $\frac{1}{2}$	-1.35	- 9.3	+ 1 19.2	5 31.2	+ 1 58.9	+0.2707	.5270	+2437	+56	-27
33 Ceti	6	1.34	9.2	1 45.7	6 47.8	+ 3 13.2	+0.1215	.5267	.2433	+48	-35
35 Ceti	6 $\frac{1}{2}$	1.34	9.1	1 47.5	7 46.4	+ 4 10.0	+0.3274	.5263	.2429	+60	-24
$f$ Piscium	6	1.32	8.7	2 56.2	10 22.8	+ 6 41.6	-0.2373	.5257	.2420	+28	-54
B. A. C. 408	6 $\frac{1}{2}$	1.29	8.2	4 4.0	12 48.9	+ 9 3.1	-0.8283	.5248	.2410	- 4	-86
$\nu$ Piscium	4 $\frac{1}{2}$	1.22	7.8	4 50.2	22 9.4	- 5 53.5	+0.5892	.5228	.2363	+79	- 9
64 Ceti	6	-1.09	- 6.0	+ 7 58.0	13 13 10.6	+ 8 40.4	+0.7511	.5210	+2256	+90	+ 1
$\xi^1$ Ceti	4 $\frac{1}{2}$	1.09	6.0	8 14.6	13 59.6	+ 9 27.9	+0.6425	.5209	.2249	+84	- 5
B. A. C. 728	6 $\frac{1}{2}$	1.05	5.2	10 15.1	18 37.2	-10 2.9	-0.4673	.5208	.2208	+16	-66
B. A. C. 741	6 $\frac{1}{2}$	1.04	5.6	9 7.9	19 46.6	- 8 55.6	+0.9838	.5208	.2197	+90	+16
$\xi$ Arietis	5 $\frac{1}{2}$	1.05	5.2	10 1.7	19 55.4	- 8 47.0	+0.0589	.5208	.2197	+44	-35
B. A. C. 755	6	1.03	5.2	9 59.2	20 54.1	- 7 50.2	+0.3196	.5208	.2187	+59	-21
31 Arietis	5 $\frac{1}{2}$	-0.99	- 4.4	+11 53.4	14 1 49.7	- 3 3.5	-0.6561	.5207	+2139	+ 6	-77
38 Arietis	5	0.95	4.3	11 54.3	6 1.9	+ 1 1.0	+0.2185	.5212	.2096	+53	-96
B. A. C. 1096	6 $\frac{1}{2}$	0.72	1.4	17 24.6	15 6 30.3	+ 0 44.6	-0.9652	.5248	.1792	-14	-73
B. A. C. 1119	6	0.68	1.7	16 7.1	9 10.0	+ 3 19.3	+0.7332	.5256	.1757	+90	+17
B. A. C. 1206	6	0.60	1.2	16 56.6	15 55.2	+ 9 52.1	+1.1695	.5267	.1657	+90	+38
B. A. C. 1240	6	0.56	0.9	17 49.8	19 39.3	-10 30.8	+0.8100	.5277	.1599	+90	+13
$\omega^1$ Tauri	6	-0.53	- 0.1	+19 16.1	23 42.7	- 6 35.0	-0.1276	.5288	+1535	+34	-37
$\omega^2$ Tauri	5 $\frac{1}{2}$	0.47	+ 0.2	20 15.7	16 3 48.6	- 2 46.6	-0.6252	.5298	.1471	+ 6	-66
53 Tauri	6 $\frac{1}{2}$	0.49	0.5	20 49.9	4 40.8	- 1 46.3	-1.0988	.5300	.1454	-26	-69
B. A. C. 1373	6	0.47	0.9	21 20.0	8 49.4	+ 2 14.5	-1.0646	.5312	.1385	-23	-69
$\iota$ Tauri	5	0.24	1.3	21 24.3	17 1 39.3	- 5 27.9	+0.9389	.5363	.1082	+90	+27
105 Tauri	6	0.22	1.3	21 32.0	3 57.0	- 3 14.7	+1.0402	.5368	.1040	+90	+34
$\pi$ Tauri	6	-0.21	+ 1.5	+21 57.7	9 18.9	+ 1 56.8	+1.0977	.5383	+0.938	+90	+40
121 Tauri	6	0.07	2.3	23 57.2	16 52.6	+ 9 15.7	-0.4508	.5401	.0787	+16	-48
B. A. C. 1774	6 $\frac{1}{2}$	0.03	2.2	23 14.9	18 40.6	+11 0.1	+0.4675	.5405	.0749	+72	+ 3
B. A. C. 1801	6	-0.01	2.3	23 8.5	20 35.2	-11 9.0	+0.7244	.5411	.0710	+90	+17
132 Tauri	5 $\frac{1}{2}$	+0.02	2.6	24 31.3	23 12.6	- 8 36.8	-0.6250	.5416	.0659	+ 5	-69
1 Geminorum	5	+0.09	+ 2.2	+23 16.1	18 6 16.9	- 1 46.4	+1.1779	.5434	+0.512	+90	+52

## ELEMENTS FOR FACILITATING THE PREDICTION OF OCCULTATIONS OF PLANETS AND STARS BY THE MOON.

FEBRUARY.

STAR'S—				AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1872.0. $\Delta\alpha$ $\Delta\delta$	Apparent Declination.	Washington Mean Time.	Hour Angle. $H$	$Y$	$x'$	$y'$	N'n.	S'n.
2 Geminorum	6 $\frac{1}{2}$	+0.10 + 2.4	+23 38.9	18 7 31.3	- 0 34.5	+0.8183	.5436	+0.0482	+90	+25
5 Geminorum	6	0.13 2.5	24 26.8	9 41.6	+ 1 31.4	+0.0342	.5440	.0437	+43	-17
B. A. C. 2154	6 $\frac{1}{2}$	0.27 2.4	24 41.7	21 40.6	-10 53.5	+0.1304	.5459	.0179	+49	- 9
e Geminorum	3 $\frac{1}{2}$	0.30 2.6	25 15.4	19 0 38.8	- 8 1.4	-0.4497	.5463	.0114	+15	-42
B. A. C. 2238	6	0.33 2.0	23 45.1	4 24.9	- 4 22.7	+1.2468	.5465	.0031	+90	+63
37 Geminor.	6	0.35 2.4	25 32.0	5 53.3	- 2 57.3	-0.7269	.5465	+0.0002	- 1	-65
o Geminorum	6	+0.38 + 2.0	+24 23.8	9 11.3	+ 0 14.0	+0.5226	.5468	-.0070	+77	+12
48 Geminor.	6	0.42 1.9	24 20.5	13 48.5	+ 4 41.9	+0.5270	.5470	.0173	+78	+12
52 Geminor.	6	0.44 2.1	25 6.3	14 49.4	+ 5 40.8	-0.3366	.5470	.0195	+22	-36
A Geminor.	5 $\frac{1}{2}$	0.49 2.0	25 17.7	18 52.3	+ 9 35.6	-0.6449	.5470	.0283	+ 4	-58
B. A. C. 2514	6 $\frac{1}{2}$	0.55 1.6	24 30.6	20 2 8.3	- 7 23.0	-0.0382	.5468	.0439	+38	-21
$\kappa$ Gemi., mult.	3 $\frac{1}{2}$	0.57 1.6	24 42.2	4 33.7	- 5 2.4	-0.3653	.5466	.0498	+20	-40
$\mu^1$ Cancri	6	+0.62 + 0.8	+22 59.9	14 43.5	+ 4 47.1	+0.9068	.5455	.0714	+90	+28
$\lambda$ Cancri	6	0.69 + 0.7	24 25.4	21 19.1	+11 9.5	-1.1787	.5448	.0843	-37	-66
$\gamma$ Cancri	4 $\frac{1}{2}$	0.74 - 0.2	21 55.6	21 8 2.3	- 2 28.5	+0.5492	.5424	.1061	+79	+ 4
B. A. C. 3138	6	0.81 1.0	21 48.5	22 24.5	+11 25.6	+1.0450	.5390	.1337	-22	-68
$\eta$ Leonis	3 $\frac{1}{2}$	0.84 2.9	17 23.1	23 0 28.6	-11 20.1	-0.2583	.5314	.1763	+27	-47
42 Leonis	6	0.83 3.3	15 37.1	7 39.1	- 4 23.0	+0.3610	.5297	.1864	+63	-15
B. A. C. 3579	6	+0.83 - 3.4	+14 59.7	11 7.1	- 1 1.4	+0.3851	.5286	-.1908	+64	-14
i Leonis	6	0.82 3.6	14 47.5	12 48.0	+ 0 36.3	+0.2831	.5280	.1931	+57	-20
k Leonis	6	0.84 3.9	14 52.1	19 54.3	+ 7 29.5	-1.2028	.5263	.2017	-33	-75
i Leonis, mult.	4	0.77 4.6	11 14.0	24 14 50.0	+ 1 50.7	-1.2850	.5223	.2211	-40	-79
$\omega$ Virginis	6 $\frac{1}{2}$	0.75 4.9	8 50.5	22 15.3	+ 9 2.7	-0.3764	.5212	.2269	-21	-61
$\xi$ Virginis	5	0.75 5.0	8 58.1	25 1 43.8	-11 35.1	-1.3056	.5207	.2295	-42	-81
$\nu$ Virginis	4 $\frac{1}{2}$	+0.74 - 4.8	+ 7 14.7	2 2.1	-11 17.3	+0.4703	.5207	-.2296	+70	-15
B. A. C. 4104	6 $\frac{1}{2}$	0.66 5.1	4 45.9	15 13.3	+ 1 30.2	+0.0388	.5200	.2370	+43	-38
c Virginis	5	0.65 5.1	4 1.5	19 40.8	+ 5 49.6	-0.2330	.5199	.2389	+29	-54
B. A. C. 4254	6	0.60 5.1	+ 2 33.5	26 4 51.7	- 9 16.0	-0.8794	.5206	.2416	- 6	-88
65 Virginis	6	0.44 4.4	- 4 15.3	27 3 32.3	-11 16.4	+0.8213	.5244	.2417	+86	+ 3
66 Virginis	6	0.43 4.4	4 29.7	4 8.5	-10 41.3	+0.9275	.5245	.2416	+86	+ 9
$\rho$ Virginis	5	0.39 - 4.3	- 5 35.7	7 50.9	- 7 5.7	+1.1896	.5255	-.2406	+85	+20
80 Virginis	6	0.39 4.5	4 44.7	9 36.9	- 5 23.0	-0.1283	.5263	.2401	+33	-48
B. A. C. 4572	6	0.36 4.5	4 51.3	13 45.9	- 1 21.6	-1.0060	.5276	.2386	-16	-90
B. A. C. 4647	6	0.31 3.9	7 25.7	19 11.4	+ 3 53.6	+0.4022	.5295	.2362	+63	-20
94 Virginis	6	0.27 3.9	8 16.9	28 0 41.0	+ 9 12.9	+0.0036	.5320	.2330	+39	-41
95 Virginis	6	0.25 3.7	8 42.2	0 53.4	+ 9 24.9	+0.3954	.5321	.2329	+62	-20
96 Virginis	6 $\frac{1}{2}$	+0.24 - 3.4	- 9 43.7	1 58.8	+10 28.3	+1.2126	.5326	-.2322	+81	+31
$\kappa$ Virginis	4 $\frac{1}{2}$	0.22 3.4	9 40.7	3 51.3	-11 42.8	+0.7264	.5335	.2311	+80	- 2
$\lambda$ Libræ	6	0.17 3.2	11 7.7	8 53.2	- 6 50.5	+1.0834	.5335	.2274	+79	+21
$\mu$ Libræ	6	+0.08 2.7	13 36.7	21 3.1	+ 4 55.6	+0.9605	.5427	.2163	+77	+13
$\sigma^1$ Libræ	6	-0.08 2.5	15 5.1	29 11 30.2	- 5 6.6	-0.5220	.5522	.1985	+ 7	-75
$\sigma^2$ Libræ	6	0.10 2.7	14 40.6	12 24.7	- 4 13.9	-1.1238	.5530	.1972	-31	-90
$\zeta$ Libræ	4	-0.13 - 2.2	-16 16.1	14 43.0	- 2 0.3	+0.0674	.5544	-.1940	+37	-37
$\eta$ Libræ	7	0.12 2.4	16 59.9	15 17.9	- 1 26.6	+0.7057	.5544	.1934	+73	- 2
B. A. C. 5099	7	0.12 2.4	16 48.7	15 34.0	- 1 11.1	+0.4628	.5550	.1927	+60	-16
$\zeta$ Libræ	6	0.15 2.2	16 10.2	15 47.6	- 0 58.1	-0.2430	.5551	.1926	+21	-55
$\zeta^1$ Libræ	6	-0.13 -2.3	-16 25.1	16 47.3	- 0 0.4	-0.1786	.5559	-.1911	+24	-51
MARCH.										
$\beta^1$ Scorpii	2	-0.32 - 1.7	-19 27.2	1 6 51.9	-10 25.7	+0.4097	.5658	-.1676	+54	-19
$\beta^2$ Scorpii	5 $\frac{1}{2}$	0.32 1.7	19 27.0	6 52.0	-10 25.6	+0.4063	.5658	.1676	+54	-19
$\omega^1$ Scorpii	4 $\frac{1}{2}$	0.32 1.3	20 19.2	1 7 25.9	- 9 52.9	+1.2023	.5665	.1663	+70	+36
$\nu^1$ Scorpii	7	0.34 2.0	19 7.0	9 39.3	- 7 44.4	-0.3956	.5679	.1622	+ 9	-66
$\nu^2$ Scorpii	4	-0.34 - 2.0	-19 7.6	9 39.7	- 7 44.1	-0.3872	.5679	-.1622	+10	-65

ELEMENTS FOR FACILITATING THE PREDICTION OF OCCULTATIONS OF  
PLANETS AND STARS BY THE MOON.

MARCH.

STAR'S—				AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1872.0. $\Delta\alpha$ $\Delta\delta$	Apparent Declination.	Washington Mean Time.	Hour Angle. $H$	$Y$	$x'$	$y'$	N'n.	S'n.
$\psi$ Ophiuchi	5	-0.42 - 1.9	-19° 44.2	<sup>d</sup> 1 14 44.9	- 2 50.0	-0.5632	.5716	-.1524	- 1	-80
$\omega$ Ophiuchi	5	0.46 1.4	21 11.4	18 3.7	+ 0 21.4	+0.4290	.5741	.1459	+53	-17
24 Ophiuchi	6 $\frac{1}{2}$	0.59 1.3	22 56.7	2 4 7.9	+10 2.6	+0.8578	.5810	.1236	+67	+ 9
B. A. C. 5758	6	0.62 1.9	21 23.1	7 57.4	-10 16.6	-1.1841	.5838	.1145	-47	-90
39 Ophi., <i>mult.</i>	6	0.70 1.2	24 8.7	12 36.9	- 5 48.1	+1.1130	.5867	.1030	+66	+20
B. A. C. 5831	6	0.70 1.2	23 55.8	12 39.2	- 5 45.9	+0.8896	.5867	.1030	+66	+11
$b$ Ophiuchi	5	-0.73 - 1.4	-24 3.3	15 55.5	- 2 37.2	+0.6933	.5887	-.0949	+65	- 2
$c$ Ophiuchi	5	0.76 1.5	23 51.7	17 55.1	- 0 42.4	+0.3128	.5898	.0897	+40	-23
63 Ophiuchi	6 $\frac{1}{2}$	0.88 1.7	24 51.6	3 3 3.6	+ 8 4.2	+0.6155	.5947	.0656	+58	- 6
4 Sagittarii	5	0.90 2.1	23 48.1	4 58.4	+ 9 54.4	-0.5754	.5958	.0600	-10	-82
7 Sagittarii	6	0.92 2.1	24 16.8	6 8.5	+11 1.7	-0.1610	.5962	.0570	+11	-51
9 Sagittarii	4 $\frac{1}{2}$	0.92 2.0	24 21.7	6 32.1	+11 24.3	-0.1009	.5962	.0555	+14	-47
B. A. C. 6161	6	-0.96 - 2.4	23 43.5	9 34.0	- 9 41.2	-0.8987	.5977	-.0471	-31	-90
B. A. C. 6217	6 $\frac{1}{2}$	1.02 2.3	24 58.4	13 17.8	- 6 6.5	+0.2004	.5990	.0370	+29	-30
$\lambda$ Sagittarii	3	1.05 2.2	25 29.4	15 44.6	- 3 45.8	+0.6443	.5998	.0296	+58	- 4
24 Sagittarii	6	1.08 2.8	24 7.5	18 1.6	- 1 34.6	-0.7905	.6005	.0231	-26	-90
26 Sagittarii	6	1.11 3.0	23 57.1	21 3.6	+ 1 20.2	-1.0219	.6013	.0144	-42	-90
B. A. C. 6369	6	1.12 2.8	25 8.5	22 9.6	+ 2 23.4	+0.1623	.6014	-.0109	+24	-32
B. A. C. 6490	6 $\frac{1}{2}$	-1.20 - 3.4	-25 1.4	4 4 50.6	+ 8 47.8	+0.0365	.6026	+.0087	+17	-39
B. A. C. 6562	6 $\frac{1}{2}$	1.25 3.3	26 7.3	8 53.3	-11 19.5	+1.1970	.6028	.0205	+64	+41
$\psi$ Sagittarii	5	1.26 3.3	25 28.5	9 46.5	-10 28.6	+0.5686	.6030	.0232	+51	- 9
B. A. C. 6576	6	1.25 3.9	24 23.8	9 47.9	-10 27.1	-0.5144	.6030	.0233	-11	-77
$\chi^1$ Sagittarii	6	1.30 4.0	24 45.5	13 28.3	- 6 56.0	-0.0479	.6030	.0344	+15	-44
$\chi^2$ Sagittarii	6 $\frac{1}{2}$	1.30 4.1	24 39.8	13 30.9	- 6 53.5	-0.1400	.6030	.0344	+10	-50
$\chi^3$ Sagittarii	6	-1.30 - 4.2	-24 12.7	13 34.3	- 6 50.1	-0.5903	.6028	+.0345	-14	-84
B. A. C. 6699	6 $\frac{1}{2}$	1.34 4.6	23 35.2	17 25.4	- 3 8.5	-1.0617	.6027	.0460	-42	-90
$\lambda^1$ Sagittarii	6	1.35 4.2	24 59.9	17 32.4	- 3 1.9	+0.3579	.6027	.0462	+39	-21
$\lambda^2$ Sagittarii	4 $\frac{1}{2}$	1.35 4.1	25 9.9	17 47.4	- 2 47.6	+0.5364	.6027	.0468	+51	-11
53 Sagittarii	6	1.34 4.7	23 43.0	19 0.5	- 1 37.4	-0.8566	.6027	.0501	-28	-90
B. A. C. 6727	6 $\frac{1}{2}$	1.34 4.7	23 43.2	19 7.1	- 1 31.1	-0.8480	.6026	.0505	-27	-90
B. A. C. 6864	6	-1.40 - 5.4	23 5.3	5 3 13.1	+ 6 14.9	-0.9750	.6010	+.0736	-33	-90
B. A. C. 6878	6 $\frac{1}{2}$	1.42 5.6	22 57.2	4 6.9	+ 7 6.5	-1.0426	.6008	.0763	-38	-90
B. A. C. 7049	6	1.50 6.3	22 48.9	14 0.7	+ 7 24.0	-0.2879	.5976	.1034	+ 9	-59
17 Capricorni	6	1.52 6.8	21 58.8	20 29.2	- 1 11.3	-0.3985	.5946	.1207	+ 5	-66
B. A. C. 7197	6	1.53 6.8	23 12.2	21 19.4	- 0 23.0	+0.9277	.5944	.1223	+67	+14
$\eta$ Capricorni	5 $\frac{1}{2}$	1.55 7.8	20 21.7	6 3 40.6	+ 5 43.0	-1.0859	.5910	.1385	-36	-90
$\chi$ Capricorni	6	-1.58 - 7.8	-21 42.5	5 17.9	+ 7 16.5	+0.4891	.5903	+.1417	+55	-14
27 Capricorni	6	1.56 7.7	21 4.2	5 41.8	+ 7 39.5	-0.0924	.5901	.1432	+23	-46
$\phi$ Capricorni	6	1.59 7.8	21 11.0	8 7.1	+ 9 59.1	+0.3745	.5887	.1487	+49	-20
33 Capricorni	6	1.62 8.0	21 23.8	11 31.8	-10 44.3	+1.1087	.5865	.1567	+69	+27
37 Capricorni	6	1.62 8.4	20 39.4	15 51.4	- 6 34.7	+1.0656	.5840	.1660	+70	+23
$\epsilon$ Capricorni	4 $\frac{1}{2}$	1.62 8.4	20 2.4	16 46.0	- 5 42.2	+0.6012	.5833	.1678	+65	- 8
$\kappa$ Capricorni	5	-1.62 - 8.8	-19 27.1	19 2.3	- 3 31.2	+0.3972	.5890	+.1725	+53	-19
B. A. C. 7550	6	1.62 8.7	20 12.5	19 15.7	- 3 18.2	+1.1943	.5818	.1728	+70	+35
29 Aqua., <i>mult.</i>	6	1.64 9.0	-17 34.9	7 3 13.4	+ 4 21.4	+0.0012	.5766	.1881	+32	-41
26 Ceti., <i>mult.</i>	6 $\frac{1}{2}$	1.56 9.6	+ 0 40.6	10 13 39.1	+11 59.9	+0.6236	.5320	.2485	+82	- 8
29 Ceti	6 $\frac{1}{2}$	1.56 9.5	1 19.2	16 40.9	- 9 3.0	+0.4615	.5314	.2477	+69	-17
33 Ceti	6	1.55 9.4	1 45.7	16 56.4	- 8 50.0	+0.3156	.5311	.2476	+59	-24
35 Ceti	6 $\frac{1}{2}$	-1.54 - 9.4	+ 1 47.5	17 54.3	- 7 53.9	+0.5226	.5308	+.2473	+74	-14
$f$ Piscium	6	1.53 9.3	2 56.2	20 28.3	- 5 24.8	-0.0330	.5302	.2463	+39	-43
B. A. C. 408	6 $\frac{1}{2}$	1.52 9.0	4 3.9	22 52.3	- 3 5.3	-0.6179	.5298	.2454	+ 9	-81
$\mu$ Piscium	4 $\frac{1}{2}$	1.52 8.7	5 28.8	11 2 30.0	+ 0 25.6	-1.2070	.5292	.2436	-30	-85
$\nu$ Piscium	4 $\frac{1}{2}$	1.47 8.5	4 50.2	8 3.4	+ 5 48.7	+0.8116	.5282	.2407	+90	+ 3
64 Ceti	6 $\frac{1}{2}$	-1.42 - 7.2	+ 7 58.0	22 47.6	- 3 54.6	+0.9986	.5270	+.2227	+90	+16

ELEMENTS FOR FACILITATING THE PREDICTION OF OCCULTATIONS OF  
PLANETS AND STARS BY THE MOON.

MARCH.

STAR'S—				AT CONJUNCTION IN R. A.							Limiting Parallels.	
Name.	Mag.	Red'ns from 1872.0. $\Delta\alpha$ $\Delta\delta$		Apparent Declination.	Washington Mean Time.	Hour Angle. $H$	$Y$	$x'$	$y'$	$N'n.$	$S'n.$	
		$\alpha$	$\delta$	$\circ$	$d$ $h$ $m$	$h$ $m$					$\circ$	
$\zeta^1$ Ceti	4 $\frac{1}{2}$	-1.41	-7.1	+ 8 14.6	11 23 35.8	- 3 7.8	+0.8917	.5270	+2290	+90	+ 8	
B. A. C. 728	6 $\frac{1}{2}$	1.40	6.4	10 15.1	12 4 7.7	+ 1 15.6	-0.2009	.5269	.2249	+30	-50	
B. A. C. 741	6 $\frac{1}{2}$	1.38	6.6	9 7.9	5 15.8	+ 2 21.7	+1.2388	.5269	.2239	+90	+36	
$\xi$ Arietis	5 $\frac{1}{2}$	1.38	6.3	10 1.7	5 24.3	+ 2 29.9	+0.3209	.5270	.2236	+60	-22	
B. A. C. 755	6	1.37	6.3	9 59.2	6 21.9	+ 3 25.7	+0.5792	.5270	.2226	+79	- 8	
31 Arietis	5 $\frac{1}{2}$	1.36	5.7	11 53.4	11 11.3	+ 8 6.2	-0.3790	.5271	.2177	+21	-60	
38 Arietis	5	-1.33	-5.4	+11 54.3	15 18.2	-11 54.6	+0.4927	.5272	+2134	+72	-11	
B. A. C. 1096	6 $\frac{1}{2}$	1.16	2.4	17 24.6	13 15 16.2	+11 18.4	-0.6584	.5303	.1821	+ 5	-71	
B. A. C. 1119	6	1.14	2.6	16 7.0	17 52.4	-10 10.3	+1.2067	.5309	.1782	+90	+40	
B. A. C. 1240	6	1.03	1.8	17 49.8	14 4 9.3	- 0 13.0	+1.1069	.5328	.1621	+90	+33	
B. A. C. 1242	6	1.07	1.0	19 50.4	4 15.7	- 0 6.8	-1.0568	.5328	.1620	-22	-70	
$\omega^1$ Tauri	6	1.02	0.8	19 16.1	8 8.2	+ 3 38.3	+0.1787	.5335	.1555	+52	-21	
$\omega^2$ Tauri	5 $\frac{1}{2}$	-0.98	-0.3	+20 15.7	11 59.9	+ 7 22.6	-0.3157	.5344	+1488	+24	-47	
53 Tauri	6 $\frac{1}{2}$	0.96	0.0	20 49.8	13 1.0	+ 8 21.7	-0.7854	.5346	.1471	- 3	-69	
B. A. C. 1373	6	0.92	+0.2	21 20.0	17 5.4	-11 41.8	-0.7508	.5354	.1339	- 1	-68	
$\iota$ Tauri	5	0.72	1.2	21 24.3	15 9 40.2	+ 4 20.8	+1.2374	.5390	.1088	+90	+53	
121 Tauri	6	0.56	2.4	23 57.2	16 0 43.1	- 5 6.0	-0.1506	.5420	.0784	+33	-30	
B. A. C. 1774	6 $\frac{1}{2}$	0.52	2.4	23 14.9	2 30.1	- 3 22.6	+0.7628	.5425	.0746	+90	+19	
B. A. C. 1801	6	-0.50	+2.4	+23 8.5	4 23.7	- 1 32.7	+1.0174	.5426	+0705	+90	+36	
132 Tauri	5 $\frac{1}{2}$	0.47	2.9	24 31.3	6 59.6	+ 0 58.0	-0.3276	.5429	.0654	+23	-39	
2 Geminorum	6 $\frac{1}{2}$	0.37	2.6	23 38.9	15 14.6	+ 8 56.4	+1.1043	.5440	.0479	+90	+44	
5 Geminorum	6	0.35	3.4	24 26.8	17 24.2	+11 1.7	+0.3209	.7442	.0428	+61	- 2	
B. A. C. 2154	6 $\frac{1}{2}$	0.18	3.5	24 41.7	17 5 19.9	- 1 26.5	+0.4061	.5451	.0174	+68	+ 5	
$\epsilon$ Geminorum	3 $\frac{1}{2}$	0.15	3.7	25 15.4	8 17.5	+ 1 25.1	-0.1743	.5454	+0108	+31	-25	
37 Geminor.	6	-0.10	+3.6	+25 32.0	13 31.2	+ 6 28.3	-0.4572	.5455	-.0011	+15	-42	
39 Geminor.	6 $\frac{1}{2}$	0.07	3.8	26 14.0	15 6.6	+ 8 0.5	-1.2508	.5455	.0043	-52	-64	
40 Geminor.	6 $\frac{1}{2}$	0.05	3.8	26 5.2	15 24.8	+ 8 18.1	-1.0735	.5455	.0054	-27	-64	
$\omega$ Geminorum	6	-0.04	3.3	24 23.8	16 48.9	+ 9 39.4	+0.7874	.5455	.0082	+90	+27	
48 Geminor.	6	+0.04	3.2	24 20.5	21 25.9	- 9 53.0	+0.7872	.5455	.0187	+90	+26	
52 Geminor.	6	0.05	3.6	25 6.3	22 26.8	- 8 54.1	-0.0774	.5455	.0208	+37	-21	
A Geminorum	5 $\frac{1}{2}$	+0.09	+3.5	+25 17.7	18 2 29.7	- 4 59.3	-0.3883	.5453	-.0296	+19	-40	
B. A. C. 2514	6 $\frac{1}{2}$	0.17	3.1	24 30.6	9 46.0	+ 2 2.3	+0.2074	.5445	.0453	+54	- 8	
$\kappa$ Gemi., mult.	3 $\frac{1}{2}$	0.21	3.1	24 42.2	12 11.5	+ 4 23.0	-0.1235	.5444	.0504	+34	-26	
$\mu^1$ Cancri	6	0.30	2.2	23 0.0	22 22.5	- 9 46.2	+1.1340	.5430	.0727	+90	+45	
$\lambda$ Cancri	6	0.41	2.5	24 25.4	19 4 59.2	- 3 22.6	-0.9605	.5420	.0858	-16	-66	
$\gamma$ Cancri	4 $\frac{1}{2}$	0.51	1.3	21 55.7	15 44.3	+ 7 1.2	+0.7492	.5396	.1075	+90	+15	
B. A. C. 3138	6	+0.65	+0.8	+21 48.5	20 6 9.0	- 3 2.1	-0.8692	.5365	-.1346	- 9	-68	
$\eta$ Leonis	3 $\frac{1}{2}$	0.82	-1.5	17 23.1	21 8 15.5	- 1 45.5	-0.1396	.5302	.1779	+33	-40	
42 Leonis	6	0.84	2.2	15 37.1	15 25.7	+ 5 11.3	+0.4622	.5283	.1886	+70	-10	
B. A. C. 3579	6	0.86	2.5	14 59.7	18 53.3	+ 8 32.5	+0.4764	.5278	.1931	+71	-10	
$\delta$ Leonis	6	0.87	2.6	14 47.5	20 34.1	+10 10.2	+0.3699	.5274	.1954	+63	-16	
$\kappa$ Leonis	6	0.91	3.0	14 52.1	22 3 39.2	- 6 57.9	-1.1277	.5260	.2044	-25	-75	
$\iota$ Leonis, mult.	4	+0.95	-4.4	+11 14.0	22 29.0	+11 17.4	-1.2557	.5235	-.2242	-36	-79	
$\omega$ Virginis	6 $\frac{1}{2}$	0.96	5.0	8 50.4	23 5 50.5	- 5 34.5	-0.3715	.5229	.2304	+22	-60	
$\xi$ Virginis	5	0.96	5.2	8 58.1	9 17.2	- 2 14.0	-1.3044	.5226	.2329	-41	-81	
$\nu$ Virginis	4 $\frac{1}{2}$	0.94	5.2	7 14.7	9 35.1	- 1 56.7	+0.4610	.5228	.2333	+69	-16	
B. A. C. 4104	6 $\frac{1}{2}$	0.96	6.0	4 45.9	22 37.7	+10 42.3	-0.0041	.5229	.2412	+41	-41	
$\epsilon$ Virginis	5	0.95	6.2	4 1.4	24 3 1.7	- 9 1.8	-0.2855	.5232	.2431	+26	-57	
B. A. C. 4254	6	+0.95	-6.4	+ 2 33.4	12 4.9	- 0 15.1	-0.9515	.5242	-.2460	-10	-88	
65 Virginis	6	0.88	6.8	- 4 15.4	25 10 22.8	- 2 38.3	+0.6814	.5295	.2465	+85	- 5	
66 Virginis	6	0.87	6.8	4 29.8	10 58.4	- 2 3.9	+0.7852	.5297	.2464	+75	0	
$\rho$ Virginis	5	0.88	6.7	5 35.8	14 36.7	+ 1 27.6	+1.0361	.5309	.2455	+85	+16	
80 Virginis	6	0.87	6.8	4 44.7	16 20.7	+ 3 8.3	-0.2759	.5312	.2450	+26	-57	
B. A. C. 4572	6	+0.86	-6.9	- 4 51.3	20 25.2	+ 7 5.1	-1.1545	.5330	-.2433	-26	-90	



ELEMENTS FOR FACILITATING THE PREDICTION OF OCCULTATIONS OF  
PLANETS AND STARS BY THE MOON.

## MARCH.

STAR'S—				AT CONJUNCTION IN R. A.					Lunar Parallel.	
Name.	Mag.	Red'ns from 1872.0. $\Delta\alpha$ $\Delta\delta$	Apparent Declination.	Washington Mean Time.	Hour Angle. $H$	$Y$	$x'$	$y'$	N'n.	S'n.
B. A. C. 4647	6	+0.84	-6.6	-7 25.8	<sup>d</sup> <sup>h</sup> <sup>m</sup> 26 1 44.6	<sup>h</sup> <sup>m</sup> -11 45.7	+0.2305	.5353	-2409	+53 -29
94 Virginis	6	0.81	6.5	8 16.9	7 8.0	-6 32.6	-0.1753	.5375	.2377	+30 -51
95 Virginis	6	0.81	6.6	8 42.2	7 20.1	-6 21.0	-0.2132	.5375	.2376	+51 -30
96 Virginis	6.4	0.81	6.3	9 43.7	8 24.3	-5 18.8	+1.0209	.5383	.2368	+80 +16
$\kappa$ Virginis	4.4	0.80	6.3	9 40.7	10 24.7	-3 22.0	+0.5343	.5389	.2356	+71 -13
2 Libræ	6	0.77	6.3	11 7.8	15 10.9	+1 14.5	+0.8798	.5414	.2317	+79 +7
$\mu$ Libræ	6	+0.73	-5.8	-13 37.0	27 3 7.3	-11 12.7	+0.7401	.5491	-.2201	+76 -1
$\nu^1$ Libræ	5	0.67	5.3	15 45.6	10 55.1	-3 40.9	+1.2630	.5528	.2107	+74 +39
$\sigma^1$ Libræ	6	0.62	5.4	15 5.2	17 20.1	+2 30.8	-0.7534	.5567	.2020	-5 -90
$\zeta^1$ Libræ	4	0.61	5.1	16 16.2	20 30.0	+5 34.0	-0.1709	.5590	.1969	+25 -51
$\zeta^2$ Libræ	7	0.60	4.9	16 59.9	21 4.4	+6 7.2	+0.4629	.5591	.1963	+60 -16
B. A. C. 5099	7	0.59	5.0	16 48.8	21 20.3	+6 22.5	+0.2213	.5592	.1960	+46 -29
$\zeta^3$ Libræ	6	+0.59	-5.1	-16 10.2	21 33.6	+6 35.3	-0.4811	.5596	-.1954	+9 -72
$\zeta^4$ Libræ	6	0.59	5.0	16 25.1	22 32.4	+7 32.1	-0.4173	.5603	.1935	+12 -67
$\beta^1$ Scorpii	2	0.48	4.1	19 27.3	28 12 26.3	-3 4.0	+0.1558	.5694	.1694	+39 -33
$\beta^2$ Scorpii	5.4	0.48	4.1	19 27.0	12 26.5	-3 3.8	+0.1515	.5694	.1694	+39 -33
$\omega^1$ Scorpii	4.4	0.47	3.8	20 19.3	13 0.0	-2 31.5	+0.9460	.5695	.1686	+70 +13
$\omega^2$ Scorpii	4.4	0.47	3.9	20 31.3	13 14.7	-2 17.4	+1.1097	.5696	.1683	+70 +26
$\nu^1$ Scorpii	7	+0.44	-4.3	-19 7.0	15 12.0	-0 24.5	-0.6489	.5709	-.1644	-4 -90
$\nu^2$ Scorpii	4	0.45	4.3	19 7.6	15 12.4	-0 24.1	-0.6402	.5709	.1644	+6 -98
B. A. C. 5395	6	0.44	3.7	21 4.3	15 52.6	+0 14.7	+1.2351	.5716	.1629	+69 +40
$\psi$ Ophiuchi	5	0.41	3.9	19 44.2	20 14.8	+4 27.2	-0.8194	.5741	.1542	-15 -90
$\omega$ Ophiuchi	5	0.36	3.6	21 11.5	23 32.0	+7 37.0	+0.1683	.5765	.1463	+37 -32
22 Ophiuchi	6.4	0.28	2.7	23 18.0	29 8 44.9	-7 31.1	+1.0551	.5818	.1260	+67 +23
24 Ophiuchi	6.4	+0.27	-2.9	-22 56.7	9 32.8	-6 45.1	+0.5942	.5822	-.1240	+61 -8
39 Ophi., mult.	6	0.18	2.5	24 8.7	18 0.4	+1 22.8	+0.8500	.5867	.1035	+66 +8
B. A. C. 5831	6	0.18	2.9	23 55.8	18 2.7	+1 25.0	+0.6273	.5867	.1034	+61 -6
$\delta$ Ophiuchi	5	0.15	2.8	24 3.3	21 19.0	+4 33.5	+0.4304	.5883	.0952	+47 -17
$\epsilon^1$ Ophiuchi	5	0.11	2.6	23 51.7	23 18.7	+6 28.5	+0.0492	.5892	.0900	+25 -39
63 Ophiuchi	6.4	+0.02	2.2	24 51.6	30 8 28.8	-8 43.3	+0.3524	.5929	.0649	+41 -21
4 Sagittarii	5	-0.02	-2.5	-23 48.1	10 24.3	-6 52.4	-0.8408	.5937	-.0594	-26 -90
7 Sagittarii	6	0.03	2.4	24 16.8	11 34.7	-5 44.9	-0.4245	.5939	.0563	-3 -69
9 Sagittarii	4.4	0.04	2.3	24 21.7	11 58.5	-5 22.0	-0.3643	.5942	.0554	0 -65
B. A. C. 6161	6	0.07	2.6	23 43.5	15 1.6	-2 26.3	-1.1649	.5947	.0469	-51 -90
B. A. C. 6217	6.4	0.11	2.1	24 58.4	18 47.3	+1 10.2	-0.0548	.5958	.0361	+15 -45
$\lambda$ Sagittarii	3	0.15	2.0	25 29.4	21 15.5	+3 32.5	+0.3886	.5961	.0222	+39 -19
24 Sagittarii	6	-0.18	-2.4	-24 7.5	23 33.9	+5 45.3	-1.0539	.5965	-.0223	-43 -90
B. A. C. 6369	6	0.24	2.2	25 8.5	31 3 44.8	+9 46.0	-0.0934	.5970	-.0103	+11 -47
$\sigma$ Sagittarii	2.4	0.29	1.8	26 27.2	7 43.3	-10 25.2	+1.2170	.5973	+0.012	+64 +44
B. A. C. 6490	6.4	0.34	2.2	25 1.4	10 31.2	-7 44.1	-0.2158	.5972	.0096	+4 -54
B. A. C. 6562	6.4	0.38	1.9	26 7.2	14 37.7	-3 47.7	+0.9570	.5969	.0213	+64 +17
$\psi$ Sagittarii	5	0.39	2.2	25 28.5	15 31.8	-2 55.8	+0.3241	.5969	.0240	+35 -23
B. A. C. 6576	6	-0.39	-2.3	-24 23.8	15 33.2	-2 54.4	-0.7677	.5969	+0.240	-25 -90
$\chi^1$ Sagittarii	6	0.43	2.6	24 45.3	19 17.5	+0 40.7	-0.2948	.5965	.0342	+2 -60
$\chi^2$ Sagittarii	6.4	0.43	2.6	24 39.7	19 20.1	+0 43.2	-0.3877	.5965	.0343	-3 -67
$\chi^3$ Sagittarii	6	0.42	2.7	24 12.7	19 23.5	+0 46.5	-0.8422	.5964	.0355	-28 -90
$\lambda^1$ Sagittarii	6	0.49	2.6	24 59.9	23 26.1	+4 39.2	+0.1184	.5958	.0467	+25 -34
$\lambda^2$ Sagittarii	4.4	-0.49	-2.4	-25 9.9	23 41.4	+4 53.9	+0.2987	.5957	+0.0472	+35 -24
APRIL.										
53 Sagittarii	6	-0.50	-3.1	-23 43.0	1 0 55.9	+6 5.4	-1.1064	.5954	+0.0506	-45 -90
B. A. C. 6727	6.4	0.50	3.1	23 43.1	1 2.7	+6 11.9	-1.0977	.5954	.0509	-44 -90
B. A. C. 6864	6	0.61	3.3	23 5.2	9 19.0	-9 51.8	-1.2193	.5932	.0737	-54 -90
B. A. C. 7049	6	0.74	3.7	22 48.9	20 22.2	+0 44.9	-0.5110	.5895	.1013	-3 -76
17 Capricorni	6	0.80	4.0	21 58.7	2 3 0.7	+7 7.8	-0.6160	.5859	.1201	-7 -86
B. A. C. 7197	6	-0.83	-3.8	-23 12.2	3 52.1	+7 57.2	+0.7279	.5853	+1.223	+67 0

## ELEMENTS FOR FACILITATING THE PREDICTION OF OCCULTATIONS OF PLANETS AND STARS BY THE MOON.

APRIL.

STAR'S—				AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1872.0. $\Delta\alpha$ $\Delta\delta$	Apparent Declination.	Washington Mean Time.	Hour Angle. $H$	$Y$	$x'$	$y'$	N'n.	S'n.
$\chi$ Capricorni	6	-0.90	-4.4	-21 42.5	2 12 3.8	- 8 10.1	+0.2960	.5806	+1415	+44 -25
27 Capricorni	6	0.91	4.6	21 4.2	12 28.3	- 7 46.5	-0.2923	.5800	.1428	+13 -59
$\phi$ Capricorni	6	0.94	4.7	21 11.0	14 57.8	- 5 22.7	+0.1842	.5792	.1481	+38 -31
33 Capricorni	6	0.96	4.6	21 23.7	18 29.3	- 2 0.2	+0.9339	.5770	.1560	+69 +13
37 Capricorni	6	1.01	5.0	20 39.3	22 55.4	+ 2 17.0	+0.8976	.5743	.1651	+70 +10
$\epsilon$ Capricorni	4.5	1.02	5.2	20 2.4	23 51.6	+ 3 11.0	+0.4287	.5736	.1670	+74 -18
$\kappa$ Capricorni	5	-1.04	-5.3	-19 27.0	3 2 11.8	+ 5 26.0	+0.2266	.5724	+1715	+43 -29
B. A. C. 7550	6	1.03	5.2	20 12.4	2 25.6	+ 5 39.3	+1.0342	.5720	.1725	+70 +19
29 Aqua., mult.	6	1.10	6.1	17 34.9	10 37.2	-10 27.1	-0.1574	.5670	.1874	+24 -50
56 Aquarii	6	1.20	6.8	15 14.5	22 44.0	+ 1 13.6	-0.1485	.5594	.2068	+27 -50
$\tau$ Aqua., mult.	6	1.25	7.0	14 43.9	4 6 28.3	+ 8 41.7	+0.9759	.5545	.2174	+76 +14
$\tau$ Aquarii	4	1.26	7.2	14 16.1	7 19.2	+ 9 30.8	+0.6879	.5542	.2182	+76 - 4
74 Aquarii	6	-1.26	-7.6	-12 17.9	9 4.8	+11 12.8	-0.9358	.5534	+2204	-14 -90
$\psi$ Aquarii	4.5	1.30	8.2	9 47.2	19 15.8	- 2 56.9	-1.2012	.5478	.2314	-33 -90
$\psi$ Aquarii	4.5	1.30	8.2	9 53.0	20 12.7	- 2 1.9	-0.8827	.5473	.2323	-10 -90
$\psi$ Aquarii	5	1.32	8.1	10 18.7	20 41.6	- 1 34.0	-0.3318	.5468	.2329	+21 -61
B. A. C. 8214	6.5	1.35	8.4	8 10.5	5 4 23.6	+ 5 52.7	-0.7042	.5431	.2393	+ 2 -90
B. A. C. 8274	6.5	1.39	8.5	7 5.6	10 30.4	+11 47.5	-0.3403	.5403	.2432	+12 -61
30 Piscium	5	-1.41	-8.6	- 6 43.7	16 52.2	- 6 3.2	+0.8427	.5378	+2465	+84 + 3
33 Piscium	5	1.42	8.6	- 6 25.6	18 29.1	- 4 29.4	+0.9317	.5372	.2473	+84 + 9
31 Arietis	5.5	1.52	5.7	+11 53.4	8 20 26.9	- 4 50.3	-0.2248	.5291	.2207	+29 -50
38 Arietis	5	1.53	5.5	11 54.3	9 0 32.3	- 0 52.7	+0.6548	.5298	.2161	+87 - 3
B. A. C. 1096	6.5	1.45	3.1	17 24.6	10 0 17.8	- 1 52.0	-0.4532	.5339	.1850	+17 -59
B. A. C. 1240	6	1.37	2.2	17 49.8	13 2.0	+10 27.7	+1.3234	.5368	.1646	+90 +60
B. A. C. 1242	6	-1.38	-1.9	+19 50.4	13 8.3	+10 33.8	-0.8323	.5368	+1645	- 5 -70
$\omega$ Tauri	6	1.36	1.8	19 16.1	16 57.9	- 9 44.1	+0.4023	.5378	.1579	+66 -10
$\omega$ Tauri	5.5	1.31	1.1	20 15.7	20 46.7	- 6 2.7	-0.0852	.5385	.1510	+38 -34
53 Tauri	6.5	1.32	0.9	20 49.8	21 47.1	- 5 4.3	-0.5522	.5389	.1493	+11 -69
56 Tauri	6.5	1.33	0.8	21 27.7	21 51.2	- 5 0.3	-1.2277	.5390	.1492	-39 -69
B. A. C. 1373	6	1.30	-0.4	21 20.0	11 1 48.4	- 1 10.9	-0.5132	.5395	.1420	+13 -58
$\tau$ Tauri	4.5	-1.26	+0.3	+22 42.5	8 26.7	+ 5 14.4	-1.1112	.5411	+1293	-27 -68
103 Tauri	6	1.15	1.5	24 5.6	20 26.2	- 7 9.8	-1.2159	.5434	.1054	-40 -66
121 Tauri	6	1.00	2.2	23 57.2	12 9 3.1	+ 5 1.8	+0.1072	.5451	.0796	+48 -16
B. A. C. 1774	6.5	0.98	2.0	23 14.9	10 49.0	+ 6 44.1	+1.0191	.5454	.0767	+90 +36
B. A. C. 1801	6	0.96	2.1	23 8.5	12 41.4	+ 8 32.8	+1.2732	.5455	.0716	+90 +62
132 Tauri	5.5	0.96	2.7	24 31.3	15 15.7	+11 1.9	-0.0668	.5458	.0665	+38 -24
5 Geminorum	6	-0.82	+3.5	+24 26.8	13 1 34.6	- 3 0.1	+0.5833	.5464	+0433	+84 +12
B. A. C. 2154	6.5	0.67	3.6	24 41.7	13 25.2	+ 8 26.5	+0.6707	.5466	.0168	+90 +19
$\epsilon$ Geminorum	3.5	0.63	4.0	25 15.4	16 21.8	+11 17.2	+0.0912	.5465	+0102	+47 -11
37 Geminor.	6	0.55	4.2	25 32.1	21 33.9	- 7 41.2	-0.1908	.5463	-0011	+30 -25
39 Geminor.	6.5	0.52	4.3	26 14.9	23 8.9	- 6 9.4	-0.9847	.5461	.0043	-19 -64
40 Geminor.	6.5	0.52	4.3	26 5.2	23 27.0	- 5 51.9	-0.8076	.5460	.0054	- 6 -64
$\omega$ Geminorum	6	-0.50	+4.0	+24 23.8	14 0 50.8	- 4 30.9	+1.0515	.5459	-0083	+90 +44
48 Geminor.	6	0.44	4.0	24 20.5	5 27.0	- 0 4.1	+1.0512	.5454	.0188	+90 +43
52 Geminor.	6	0.43	4.2	25 6.3	6 27.7	+ 0 54.6	+0.1869	.5453	.0210	+53 - 6
A Geminorum	5.5	0.39	4.4	25 17.7	10 30.2	+ 4 49.0	-0.1255	.5446	.0299	+34 -24
B. A. C. 2514	6.5	0.29	4.1	24 30.6	17 46.1	+11 50.2	+0.4690	.5436	.0452	+73 + 6
$\kappa$ Gemi., mult.	3.5	0.26	4.3	24 42.2	20 11.7	- 9 49.0	+0.1385	.5433	.0506	+50 -12
$\omega$ Cancri	6.5	-0.15	+4.4	+25 26.4	15 4 12.3	- 2 4.4	-1.1516	.5418	-0677	-34 -65
$\lambda$ Cancri	6	-0.04	4.1	24 25.5	13 1.7	+ 6 27.6	-0.7083	.5396	.0861	+ 1 -65
$\nu$ Cancri	6.5	+0.02	4.1	24 34.1	16 49.6	+10 8.0	-1.2089	.5385	.0939	-40 -66
$\nu$ Cancri	6	0.03	4.1	24 30.7	18 11.8	+11 27.5	-1.2767	.5384	.0965	-53 -66
$\gamma$ Cancri	4.5	0.10	3.2	21 55.7	23 49.9	- 7 5.5	+0.9972	.5368	.1078	+90 +31
$\xi$ Cancri	5	+0.25	+3.2	+22 33.7	16 12 16.4	+ 4 56.1	-1.1890	.5335	-1311	-35 -68

ELEMENTS FOR FACILITATING THE PREDICTION OF OCCULTATIONS OF  
PLANETS AND STARS BY THE MOON.

APRIL.

STAR'S—					AT CONJUNCTION IN R. A.							Limiting Parallels.	
Name.	Magn.	Red'ns from 1872.0.		Apparent Declination.	Washington Mean Time.	Hour Angle. H	Y	$\alpha'$	$\gamma'$	N'n.	S'n.		
		$\Delta\alpha$	$\Delta\delta$		d h m	h m							
79 Cancri	6	+0.25	+3.1	+22 30.9	16 12 45.0	+ 5 24.6	-1.1998	.5333	-.1321	0	-63		
B. A. C. 3138	6	0.28	2.8	21 48.6	14 20.5	+ 6 57.1	-0.6365	.5329	.1347	+ 6	-65		
$\gamma$ Leonis	3.4	0.55	+0.4	17 23.1	17 16 40.6	+ 8 27.5	+0.0643	.5259	.1783	+45	-29		
42 Leonis	6	0.60	-0.4	15 37.2	23 54.8	- 8 31.8	+0.6572	.5245	.1885	+88	0		
B. A. C. 3579	6	0.63	0.8	14 59.8	18 3 24.3	- 5 8.7	+0.6662	.5237	.1935	+99	0		
$\epsilon$ Leonis	6	0.64	1.0	14 47.6	4 5.9	- 4 30.2	+0.5569	.5235	.1955	+78	- 6		
$\kappa$ Leonis	6	+0.71	-1.2	+14 52.2	12 14.7	+ 3 25.4	-0.9548	.5222	-.2044	-12	-75		
$\iota$ Leonis, mult.	4	0.85	3.0	11 14.0	19 7 12.5	- 2 11.2	-1.1156	.5204	.2247	-23	-79		
$\omega$ Virginis	6.4	0.88	3.8	8 50.5	14 36.3	+ 4 59.2	-0.2458	.5204	.2314	+28	-53		
$\xi$ Virginis	5	0.91	3.9	8 58.1	18 3.8	+ 8 20.5	-1.1847	.5204	.2340	-28	-81		
$\nu$ Virginis	4.4	0.91	4.3	7 14.7	18 21.8	+ 8 37.9	+0.5786	.5205	.2341	+79	-10		
$\pi$ Virginis	4.4	0.95	4.7	7 19.6	20 1 58.3	- 7 59.3	-1.3095	.5204	.2395	-41	-83		
B. A. C. 4104	6.4	+0.97	-5.3	+ 4 45.9	7 25.8	- 2 41.7	+0.0861	.5214	-.2427	+46	-36		
$\epsilon$ Virginis	5	0.98	5.6	4 1.4	11 49.8	+ 1 34.1	-0.2043	.5222	.2448	+31	-52		
B. A. C. 4254	6	1.03	6.0	+ 2 33.4	20 51.8	+10 19.7	-0.8874	.5242	.2482	- 6	-88		
65 Virginis	6	1.08	7.2	- 4 15.4	21 19 0.5	+ 7 47.2	+0.6861	.5315	.2497	+86	- 5		
66 Virginis	6	1.08	7.3	4 29.8	19 35.9	+ 8 21.5	+0.7879	.5320	.2496	+74	0		
$\beta$ Virginis	5	1.10	7.5	5 35.8	23 11.7	+11 50.5	+1.0285	.5333	.2499	+85	+15		
80 Virginis	6	+1.09	-7.4	- 4 44.7	22 0 54.5	-10 30.0	-0.2782	.5342	-.2484	+26	-57		
B. A. C. 4572	6	1.10	7.5	4 51.3	4 55.9	- 6 36.3	-1.1596	.5362	.2471	-26	-91		
B. A. C. 4647	6	1.12	7.6	7 25.8	10 10.7	- 1 31.7	+0.2034	.5388	.2448	+51	-31		
94 Virginis	6	1.11	7.5	8 16.9	15 29.0	+ 3 36.3	-0.2105	.5419	.2417	+29	-53		
95 Virginis	6	1.11	7.6	8 42.2	15 41.0	+ 3 47.8	+0.1743	.5420	.2416	+49	-32		
96 Virginis	6.4	1.13	7.7	9 43.7	16 44.1	+ 4 48.9	+0.9723	.5426	.2409	+80	+12		
$\kappa$ Virginis	4.4	+1.13	-7.6	- 9 40.8	18 32.6	+ 6 33.8	+0.4863	.5437	-.2397	+68	-16		
2 Libræ	6	1.14	7.6	11 7.8	23 23.5	+11 14.9	+0.8179	.5468	.2359	+79	+ 2		
$\mu$ Libræ	6	1.14	7.2	13 37.0	23 11 5.5	- 1 26.8	+0.6551	.5540	.2245	+75	- 6		
$\nu$ Libræ	5	1.13	6.8	15 45.7	18 42.9	+ 5 54.6	+1.1577	.5595	.2151	+74	+28		
$\sigma$ Libræ	6	1.12	7.0	15 5.2	24 0 58.8	+11 57.2	-0.8474	.5638	.2063	-11	-90		
$\zeta$ Libræ	4	1.13	6.8	16 16.2	4 4.1	- 9 4.2	-0.2771	.5661	.2017	+20	-58		
$\zeta$ Libræ	7	+1.13	-6.7	-16 59.9	4 37.7	- 8 31.8	+0.3487	.5666	-.2005	+53	-23		
B. A. C. 5099	7	1.13	6.6	16 48.8	4 53.1	- 8 16.9	+0.1093	.5668	.2002	+40	-36		
$\zeta$ Libræ	6	1.13	6.9	16 10.2	5 6.2	- 8 4.3	-0.5855	.5668	.1999	+ 3	-81		
$\zeta$ Libræ	6	1.12	6.6	16 25.1	6 3.5	- 7 9.1	-0.5241	.5675	.1984	+ 7	-75		
$\lambda$ Libræ	6	1.11	6.0	19 47.0	14 35.3	+ 1 3.9	+1.2503	.5736	.1834	+70	+40		
$\beta$ Scorpii	2	1.09	5.9	19 27.3	19 36.2	+ 5 53.5	+0.0218	.5773	.1734	+32	-40		
$\beta$ Scorpii	5.4	+1.11	-5.7	-19 27.1	19 36.4	+ 5 53.7	+0.0175	.5773	-.1734	+32	-40		
$\omega$ Scorpii	4.4	1.11	5.7	20 19.3	20 9.0	+ 6 25.1	+0.8024	.5776	.1727	+70	+ 4		
$\omega$ Scorpii	4.4	1.12	5.6	20 31.3	20 23.3	+ 6 38.9	+0.9638	.5781	.1718	+70	+14		
$\nu$ Scorpii	7	1.10	5.7	19 7.1	22 17.6	+ 8 28.8	-0.7779	.5789	.1684	-11	-90		
$\nu$ Scorpii	4	1.10	5.6	19 7.6	22 18.0	+ 8 29.2	-0.7689	.5789	.1684	-11	-90		
B. A. C. 5395	6	1.11	5.4	21 4.4	22 57.1	+ 9 6.8	+1.0839	.5794	.1668	+69	+24		
$\psi$ Ophiuchi	5	+1.07	-5.5	-19 44.2	25 3 12.4	-10 47.6	-0.9528	.5821	-.1578	-23	-90		
$\omega$ Ophiuchi	5	1.05	5.0	21 11.5	6 24.5	- 7 43.0	+0.0200	.5847	.1501	+89	-41		
22 Ophiuchi	6.4	1.02	4.2	23 18.0	15 23.1	+ 0 54.6	+0.8865	.5943	.1287	+67	+10		
24 Ophiuchi	6.4	1.02	4.3	22 56.7	16 9.7	+ 1 39.3	+0.4298	.5903	.1274	+50	-18		
39 Oph., mult.	6	0.97	3.3	24 8.7	26 0 24.6	+ 9 34.5	+0.6747	.5947	.1055	+64	- 3		
B. A. C. 5831	6	0.97	3.3	23 55.8	0 26.8	+ 9 36.6	+0.4545	.5947	.1054	+50	-16		
$\theta$ Ophiuchi	3.4	+0.96	-3.2	-24 52.2	1 56.2	+11 2.4	+1.2439	.5952	-.1018	+65	+46		
$\delta$ Ophiuchi	5	0.95	3.3	24 3.4	3 38.3	-11 19.7	+0.2566	.5961	.0970	+37	-27		
$\epsilon$ Ophiuchi	5	0.93	3.1	23 51.7	5 35.1	- 9 27.5	-0.1227	.5968	.0916	+16	-49		
63 Ophiuchi	6.4	0.86	2.5	24 51.6	14 32.5	- 0 52.1	+0.1708	.6001	.0664	+29	-32		
4 Sagittarii	5	0.83	2.7	23 48.1	16 25.5	+ 0 56.2	-1.0130	.6005	.0616	-37	-90		
7 Sagittarii	6	+0.82	-2.4	-24 16.8	17 34.4	+ 2 2.3	-0.6012	.6006	-.0579	-12	-87		

## ELEMENTS FOR FACILITATING THE PREDICTION OF OCCULTATIONS OF PLANETS AND STARS BY THE MOON.

APRIL.

STAR'S—					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1872.0. $\Delta\alpha$	$\Delta\delta$	Apparent Declination.	Washington Mean Time.	Hour Angle. $H$	$Y$	$z'$	$y'$	N'n.	S'n.
9 Sagittarii	4 $\frac{1}{2}$	+0.82	-2.4	-24 21.7	26 17 57.6	+ 2 24.6	-0.5419	.6006	-.0568	- 9	-79
B. A. C. 6217	6 $\frac{1}{2}$	0.79	1.8	24 58.4	27 0 38.0	+ 8 48.3	-0.2392	.6017	.0369	+ 5	-56
$\lambda$ Sagittarii	3	0.74	1.6	25 29.4	3 3.4	+11 7.7	+0.1990	.6020	.0300	+28	-30
24 Sagittarii	6	0.71	1.8	24 7.5	5 19.2	-10 42.1	-1.2334	.6021	.0235	-60	-90
B. A. C. 6369	6	0.68	1.3	25 8.5	9 25.6	- 6 45.9	-0.2822	.6021	-.0106	+ 1	-59
$\sigma$ Sagittarii	2 $\frac{1}{2}$	0.60	0.8	26 27.2	13 20.2	- 3 1.0	+1.0179	.6020	+0.0004	+64	+22
B. A. C. 6490	6 $\frac{1}{2}$	+0.57	-1.1	-25 1.4	16 5.6	- 0 22.4	-0.4072	.6016	+0.0088	- 6	-68
B. A. C. 6562	6 $\frac{1}{2}$	0.53	0.6	26 7.2	20 8.5	+ 3 30.5	+0.7579	.6012	.0208	+64	+ 3
$\psi$ Sagittarii	5	0.53	0.7	25 28.5	21 1.9	+ 4 21.6	+0.1281	.6006	.0235	+24	-34
B. A. C. 6576	6	0.52	0.9	24 23.7	21 3.3	+ 4 22.9	-0.9581	.6006	.0236	-36	-90
$\chi^1$ Sagittarii	6	0.48	0.8	24 45.3	28 0 44.8	+ 7 55.4	-0.4887	.5997	.0347	- 8	-75
$\chi^2$ Sagittarii	6 $\frac{1}{2}$	0.48	0.8	24 39.7	0 47.4	+ 7 57.9	-0.5852	.5997	.0348	-13	-84
$\chi^3$ Sagittarii	6	+0.48	-0.9	-24 12.7	0 50.8	+ 8 1.1	-1.0335	.5996	+0.0349	-41	-90
$\lambda^1$ Sagittarii	6	0.43	0.5	24 59.8	4 50.7	+11 51.1	-0.0784	.5987	.0466	+14	-46
$\lambda^2$ Sagittarii	4 $\frac{1}{2}$	0.43	0.5	25 9.8	5 5.8	-11 54.3	+0.1014	.5987	.0471	+24	-36
B. A. C. 7049	6	0.12	0.5	22 48.9	29 1 39.0	+ 7 49.1	-0.7097	.5987	.1035	-14	-90
17 Capricorni	6	0.04	0.5	21 58.7	8 17.2	- 9 48.3	-0.8128	.5847	.1201	-18	-90
B. A. C. 7197	6	+0.04	0.1	23 12.1	9 8.8	- 8 58.8	+0.5316	.5840	.1223	+56	-12
$\chi$ Capricorni	6	-0.08	-0.6	-21 42.4	17 21.7	- 1 4.8	+0.1021	.5788	+1413	+33	-36
27 Capricorni	6	0.09	0.8	21 4.1	17 26.4	- 1 1.1	-0.4872	.5781	.1426	+ 2	-74
$\phi$ Capricorni	6	0.11	0.6	21 10.9	20 16.6	+ 1 43.4	-0.0099	.5780	.1457	+28	-42
33 Capricorni	6	0.16	0.7	21 23.7	23 48.4	+ 5 7.2	-0.7442	.5739	.1557	+68	0
35 Capricorni	6	0.17	0.5	21 44.9	30 1 5.4	+ 6 21.3	+1.3053	.5731	.1582	+68	+54
37 Capricorni	6	-0.22	-0.8	-20 39.2	4 17.6	+ 9 26.4	+0.7109	.5710	+1646	+69	- 2
$\epsilon$ Capricorni	4 $\frac{1}{2}$	0.23	1.0	20 2.3	5 14.2	+10 20.9	+0.2409	.5702	.1665	+43	-28
$\kappa$ Capricorni	5	0.26	1.2	19 26.9	7 35.7	-11 22.8	+0.0391	.5683	.1714	+33	-39
B. A. C. 7550	6	0.26	0.9	20 12.3	7 49.6	-11 9.5	+0.8502	.5682	.1717	+70	+ 6
29 Aqua., mult.	6	-0.37	-1.7	-17 34.8	16 6.8	- 3 10.2	-0.3410	.5622	+1865	+15	-62

MAY.

56 Aquarii	6	-0.50	-2.4	-15 14.4	1 4 24.0	+ 8 41.1	-0.3223	.5534	+2059	+18	-61
$\tau^1$ Aqua., mult.	6	0.59	2.5	14 43.9	12 16.3	- 7 42.9	+0.8175	.5485	.2159	+76	+ 3
$\tau^2$ Aquarii	4	0.60	2.6	14 16.1	13 8.1	- 6 52.8	+0.5284	.5479	.2170	+67	-13
74 Aquarii	6	0.60	3.3	12 17.9	14 55.6	- 5 8.9	-1.1051	.5469	.2192	-26	-90
$\psi^1$ Aquarii	4 $\frac{1}{2}$	0.72	3.9	9 47.2	2 1 18.7	+ 4 53.4	-1.3611	.5408	.2299	-54	-90
$\psi^2$ Aquarii	4 $\frac{1}{2}$	0.72	3.9	9 52.9	2 16.7	+ 5 49.5	-1.0385	.5403	.2307	-20	-90
$\psi^3$ Aquarii	5	-0.73	-3.8	-10 18.7	2 46.3	+ 6 18.1	-0.4828	.5399	+2313	+13	-71
B. A. C. 8214	6 $\frac{1}{2}$	0.82	4.2	8 10.4	10 38.0	-10 5.5	-0.8482	.5358	.2376	- 6	-90
B. A. C. 8274	6 $\frac{1}{2}$	0.87	4.6	7 5.6	16 52.7	- 4 2.8	-0.4729	.5332	.2416	+15	-70
30 Piscium	5	0.90	4.4	6 43.6	23 23.3	+ 2 15.4	+0.7315	.5304	.2449	+82	- 3
33 Piscium	5	0.92	4.5	6 25.5	3 1 2.4	+ 3 51.4	+0.8232	.5299	.2455	+84	+ 2
B. A. C. 17	6 $\frac{1}{2}$	0.93	4.6	5 57.7	3 28.4	+ 6 12.9	+0.9406	.5291	.2465	+84	+1
B. A. C. 81	6 $\frac{1}{2}$	-0.99	-5.2	- 2 55.7	10 26.9	-11 1.6	-0.4900	.5277	+2481	+16	-71
14 Ceti	6 $\frac{1}{2}$	1.04	5.5	1 12.7	15 54.3	- 5 44.4	-0.9258	.5258	.2493	- 9	-90
15 Ceti	6 $\frac{1}{2}$	1.05	5.5	- 1 12.6	17 10.6	- 4 30.4	-0.6108	.5254	.2494	+ 9	-90
26 Ceti, mult.	6 $\frac{1}{2}$	1.12	5.5	+ 0 40.7	4 6 0.5	+ 7 55.8	+0.6128	.5234	.2488	+31	- 9
29 Ceti	6 $\frac{1}{2}$	1.14	5.5	1 19.3	8 5.9	+ 9 57.4	+0.4575	.5231	.2484	+69	-17
33 Ceti	6	1.16	5.6	1 45.7	9 23.5	+11 12.6	+0.3156	.5229	.2481	+69	-2
35 Ceti	6 $\frac{1}{2}$	-1.16	-5.6	+ 1 47.6	10 23.1	-11 49.5	+0.5297	.5229	+2479	+75	-11
$f$ Piscium	6	1.18	5.7	2 56.3	13 1.3	- 9 16.2	-0.0219	.5228	.2472	+40	-4
B. A. C. 408	6 $\frac{1}{2}$	1.19	5.7	4 4.0	15 29.0	- 6 53.0	-0.6031	.5228	.2464	+10	-
$\mu$ Piscium	4 $\frac{1}{2}$	1.21	5.7	5 28.9	19 11.9	- 3 16.9	-1.1828	.5227	.2451	-27	-
$\nu$ Piscium	4 $\frac{1}{2}$	1.22	5.4	4 50.2	5 0 52.7	+ 2 13.6	+0.8819	.5229	.2424	+10	-
$\tau$ Tauri	4 $\frac{1}{2}$	-1.38	-0.3	+22 42.6	8 16 32.3	- 8 52.1	-1.0137	.5428	+1310	-1	-

ELEMENTS FOR FACILITATING THE PREDICTION OF OCCULTATIONS OF  
PLANETS AND STARS BY THE MOON.

MAY.

STAR'S—				AT CONJUNCTION IN R. A.						Limiting Parallels.	
Name.	Mag.	Red'ns from 1872.0. $\Delta\alpha$ $\Delta\delta$		Apparent Declination.	Washington Mean Time.	Hour Angle. $H$	$Y$	$x'$	$y'$	N.n.	S.n.
		$\alpha$	$\delta$		$d$ $h$ $m$	$h$ $m$					
99 Tauri	6 $\frac{1}{2}$	-1.35	+0.4	+23 44.8	8 23 44.2	- 1 54.6	-1.2557	.5444	+1168	-46	-66
103 Tauri	6	1.34	0.8	24 5.6	9 4 29.2	+ 2 40.9	-1.1051	.5455	.1069	-24	-66
118 Tauri	6	1.28	1.7	25 2.7	14 11.1	-11 56.7	-1.2081	.5471	.0870	-40	-65
121 Tauri	6	1.23	1.6	23 57.1	17 2.5	- 9 11.1	+0.2300	.5475	.0808	+56	-10
B. A. C. 1774	6 $\frac{1}{2}$	1.23	1.7	23 14.9	18 47.9	- 7 29.3	+1.1429	.5479	.0769	+90	+46
132 Tauri	5 $\frac{1}{2}$	1.21	2.3	24 31.3	23 13.1	- 3 12.9	+0.0609	.5483	.0675	+45	-18
139 Tauri	5 $\frac{1}{2}$	-1.18	+2.7	+25 56.2	10 3 16.4	+ 0 42.2	-1.2414	.5487	+0.586	-47	-64
5 Geminorum	6	1.11	2.9	24 26.8	9 28.8	+ 6 41.9	+0.7186	.5489	.0443	+90	+19
B. A. C. 2154	6 $\frac{1}{2}$	0.98	3.5	24 41.7	21 15.9	- 5 55.0	+0.8134	.5487	.0180	+90	+27
$\epsilon$ Geminorum	3 $\frac{1}{2}$	0.97	3.8	25 15.4	11 0 11.7	- 3 5.1	+0.2356	.5485	+0.114	+56	- 3
37 Geminor.	6	0.91	4.1	25 32.1	5 22.6	+ 1 55.2	-0.0439	.5480	-.0008	+39	-17
39 Geminor.	6 $\frac{1}{2}$	0.89	4.4	26 15.0	6 57.2	+ 3 26.6	-0.8373	.5479	.0040	- 8	-64
40 Geminor.	6 $\frac{1}{2}$	-0.89	+4.3	+26 5.2	7 15.3	+ 3 44.1	-0.6599	.5479	-.0045	+ 4	-58
$\omega$ Geminorum	6	0.87	4.0	24 23.8	8 38.8	+ 5 4.8	+1.2014	.5477	.0079	+90	+57
48 Geminor.	6	0.82	4.2	24 20.5	13 14.0	+ 9 30.7	+1.2034	.5470	.0173	+90	+57
52 Geminor.	6	0.82	4.5	25 6.3	14 14.6	+10 29.2	+0.3384	.5468	.0233	+63	+ 1
A Geminor.	5 $\frac{1}{2}$	0.77	4.6	25 17.7	18 16.6	- 9 37.0	+0.0271	.5460	.0291	+43	-16
B. A. C. 2514	6 $\frac{1}{2}$	0.69	4.7	24 30.6	12 1 31.8	- 2 36.3	+0.6255	.5444	.0455	+89	+14
$c$ Geminorum	6	-0.66	+5.2	+26 5.3	3 45.8	- 0 26.8	-1.2289	.5439	-.0502	-45	-64
$\kappa$ Gemi., mult.	3 $\frac{1}{2}$	0.65	4.9	24 42.2	3 57.2	- 0 15.8	+0.2951	.5439	.0506	+60	- 4
$\omega^2$ Cancri	6 $\frac{1}{2}$	0.56	5.2	25 26.4	11 58.0	+ 7 29.0	-0.9956	.5416	.0677	-19	-65
$\lambda$ Cancri	6	0.43	5.2	24 25.5	20 48.3	- 7 58.1	-0.5500	.5390	.0860	+10	-55
$\nu^2$ Cancri	6 $\frac{1}{2}$	0.39	5.3	24 34.1	13 0 36.9	- 4 17.0	-1.0522	.5378	.0938	-23	-66
$\nu^3$ Cancri	6	0.37	5.3	24 30.7	1 59.5	- 2 57.0	-1.1194	.5373	.0964	-29	-66
32 Cancri	6	-0.37	+5.3	+24 31.2	2 41.9	- 2 16.0	-1.1965	.5370	-.0979	-38	-66
$\gamma$ Cancri	4 $\frac{1}{2}$	0.31	4.4	21 55.7	7 39.1	+ 2 31.5	+1.1623	.5353	.1075	+90	+44
$\xi$ Cancri	5	0.14	4.6	22 33.8	20 10.4	- 9 21.3	-1.0323	.5309	.1306	-20	-68
79 Cancri	6	0.14	4.5	22 30.9	20 39.3	- 8 53.3	-1.0430	.5308	.1317	-21	-68
B. A. C. 3138	6	-0.11	4.2	21 48.6	22 15.6	- 7 20.0	-0.4779	.5303	.1343	+15	-55
B. A. C. 3292	6 $\frac{1}{2}$	+0.04	3.9	20 52.5	14 10 40.6	+ 4 41.6	-1.2471	.5260	.1555	-41	-69
$\eta$ Leonis	3 $\frac{1}{2}$	+0.21	+2.4	+17 23.2	15 0 53.2	- 5 32.1	+0.2206	.5216	-.1770	+54	-22
42 Leonis	6	0.27	1.6	15 37.2	8 13.4	+ 1 34.7	+0.8138	.5196	.1871	+90	+ 9
B. A. C. 3579	6	0.31	1.3	14 59.8	11 46.0	+ 5 0.9	+0.8215	.5187	.1920	+90	+ 9
$\alpha$ Leonis	6	0.32	0.9	14 47.6	13 29.2	+ 6 40.9	+0.7106	.5182	.1943	+90	+ 2
$\kappa$ Leonis	6	0.39	+1.0	14 52.2	20 44.7	-10 16.6	-0.8143	.5169	.2031	- 3	-75
$\iota$ Leonis, mult.	4	0.58	-0.8	11 14.0	16 16 1.6	+ 8 25.8	-0.9892	.5145	.2231	-13	-79
$\omega$ Virginis	6 $\frac{1}{2}$	+0.67	-1.9	+ 8 50.5	23 33.0	- 8 16.1	-0.1202	.5145	-.2297	+35	-46
$\xi$ Virginis	5	0.69	1.8	8 58.1	17 3 4.0	- 4 51.4	-1.0676	.5146	.2323	-18	-81
$\nu$ Virginis	4 $\frac{1}{2}$	0.68	2.4	7 14.7	3 22.3	- 4 33.6	+0.7068	.5146	.2327	+90	- 3
$\pi$ Virginis	4 $\frac{1}{2}$	0.75	2.7	7 19.6	11 6.4	+ 2 56.8	-1.2003	.5153	.2378	-29	-83
B. A. C. 4104	6 $\frac{1}{2}$	0.79	3.6	4 45.9	16 39.2	+ 8 19.7	+0.1973	.5162	.2412	+53	-31
$c$ Virginis	5	0.83	3.9	4 1.5	21 7.2	-11 20.4	-0.0991	.5169	.2433	+36	-46
B. A. C. 4254	6	+0.92	-4.5	+ 2 33.5	18 6 16.9	- 2 27.2	-0.7952	.5198	-.2474	- 1	-73
65 Virginis	6	1.08	6.7	- 4 15.4	19 4 40.3	- 4 45.0	+0.7561	.5283	.2493	+81	- 2
66 Virginis	6	1.08	6.8	4 29.8	5 15.8	- 4 10.6	+0.8574	.5284	.2493	+86	+ 4
$\beta$ Virginis	5	1.10	7.0	5 35.8	8 53.2	- 0 40.0	+1.0932	.5304	.2487	+85	+20
80 Virginis	6	1.12	6.8	4 44.7	10 36.7	+ 1 0.2	-0.2169	.5314	.2486	+30	-54
B. A. C. 4372	6	1.16	6.8	4 51.3	14 39.5	+ 4 55.2	-1.1038	.5337	.2472	-22	-90
B. A. C. 4647	6	+1.20	-7.4	- 7 25.8	19 55.5	+10 1.2	+0.2529	.5370	-.2451	+55	-28
94 Virginis	6	1.24	7.5	8 16.9	20 1 14.4	- 8 50.3	-0.1675	.5405	.2424	+31	-51
95 Virginis	6	1.24	7.5	8 42.2	1 26.3	- 8 38.8	+0.2165	.5407	.2422	+52	-13
96 Virginis	6 $\frac{1}{2}$	1.25	7.7	9 43.7	2 29.5	- 7 37.6	+1.0120	.5415	.2416	+81	+15
$\kappa$ Virginis	4 $\frac{1}{2}$	1.25	7.6	9 40.8	4 18.0	- 5 52.7	+0.5242	.5424	.2405	+70	-14
2 Libræ	6	+1.24	-7.7	-11 7.8	9 8.6	- 1 11.9	+0.8486	.5461	-.2371	+79	+ 4

## ELEMENTS FOR FACILITATING THE PREDICTION OF OCCULTATIONS OF PLANETS AND STARS BY THE MOON.

MAY.

STAR'S—				AT CONJUNCTION IN R. A.						Limiting Parallels.	
Name.	Mag.	Red'ns from 1872.0. $\Delta\alpha$	$\Delta\delta$	Apparent Declination.	Washington Mean Time.	Hour Angle. $H$	$Y$	$x'$	$y'$	N'n.	S'n.
$\mu$ Libræ	6	+1.36	-7.9	-13 37.0	20 20 47.7	+10 3.4	+0.6702	.5554	-.2262	+76	- 6
$\nu^1$ Libræ	5	1.42	7.7	15 45.7	21 4 21.4	- 6 38.8	+1.1601	.5616	.2173	+74	+27
$\phi^1$ Libræ	6	1.43	7.5	15 5.2	10 33.3	- 0 40.3	-0.8404	.5670	.2085	-10	-90
$\zeta^1$ Libræ	4	1.44	7.5	16 16.2	13 36.3	+ 2 16.0	-0.2774	.5696	.2038	+20	-58
$\gamma^2$ Libræ	7	1.45	7.4	17 0.0	14 9.4	+ 2 47.9	+0.3433	.5699	.2031	+53	-23
B. A. C. 5099	7	1.45	7.3	16 48.8	14 24.6	+ 3 2.5	+0.1063	.5706	.2024	+39	-36
$\zeta^2$ Libræ	6	+1.45	-7.3	-16 10.3	14 37.5	+ 3 14.9	-0.5845	.5706	-.2022	+ 3	-81
$\lambda^1$ Libræ	6	1.46	7.3	16 25.1	15 34.1	+ 4 9.5	-0.5246	.5716	.2005	+ 6	-75
$\lambda^2$ Libræ	6	1.53	7.0	19 47.0	22 23 57.9	-11 45.5	+1.2252	.5785	.1860	+70	+37
$\beta^1$ Scorpii	2	1.53	6.6	19 27.3	4 53.5	- 7 1.1	+0.0024	.5828	.1763	+31	-42
$\beta^2$ Scorpii	5 $\frac{1}{2}$	1.53	6.6	19 27.1	4 53.6	- 7 1.0	-0.0018	.5828	.1763	+31	-42
$\omega^1$ Scorpii	4 $\frac{1}{2}$	1.54	6.7	20 19.3	5 25.6	- 6 30.4	+0.7750	.5833	.1750	+70	+ 2
$\omega^2$ Scorpii	4 $\frac{1}{2}$	+1.54	-6.6	-20 31.4	5 39.6	- 6 16.8	+0.9345	.5834	-.1746	+70	+12
$\nu^2$ Scorpii	7	1.54	6.5	19 7.1	7 31.7	- 4 29.1	-0.7916	.5848	.1707	-12	-90
$\nu^2$ Scorpii	4	1.54	6.5	19 7.7	7 32.1	- 4 28.7	-0.7832	.5848	.1707	-12	-90
B. A. C. 5395	6	1.54	6.4	21 4.4	8 10.5	- 3 51.8	+1.0508	.5852	.1697	+69	+21
$\psi$ Ophiuchi	5	1.54	6.1	19 44.2	12 20.5	+ 0 8.5	-0.9692	.5886	.1607	-24	-90
$\omega$ Ophiuchi	5	1.55	5.8	21 11.5	15 28.4	+ 3 8.9	-0.0103	.5914	.1530	+28	-42
22 Ophiuchi	6 $\frac{1}{2}$	+1.60	-5.0	-23 18.0	23 0 14.3	+11 33.7	+0.8381	.5976	-.1319	+67	+ 6
24 Ophiuchi	6 $\frac{1}{2}$	1.60	4.9	22 56.7	0 59.7	-11 42.8	+0.3861	.5983	.1299	+47	-20
39 Ophi., <i>mult.</i>	6	1.58	4.0	24 8.8	9 1.7	- 4 0.6	+0.6207	.6031	.1084	+61	- 6
B. A. C. 5831	6	1.58	4.2	23 55.8	9 3.8	- 3 58.6	+0.4032	.6031	.1083	+46	-19
$\theta$ Ophiuchi	3 $\frac{1}{2}$	1.61	3.8	24 52.2	10 30.8	- 2 35.2	+1.1817	.6041	.1038	+65	+36
$\delta$ Ophiuchi	5	1.58	3.8	24 3.4	12 10.0	- 1 0.2	+0.2053	.6046	.0997	+34	-30
$\epsilon^2$ Ophiuchi	5	+1.58	-3.6	-23 51.7	14 3.6	+ 0 48.7	-0.1702	.6058	-.0942	+14	-52
63 Ophiuchi	6 $\frac{1}{2}$	1.57	2.6	24 51.6	22 45.5	+ 9 8.6	+0.1125	.6095	.0684	+26	+35
4 Sagittarii	5	1.55	2.4	23 48.1	24 0 35.1	+10 53.6	-1.0563	.6101	.0626	-40	-90
7 Sagittarii	6	1.55	2.4	24 16.8	1 42.0	+11 57.7	-0.6509	.6102	.0593	-15	-90
9 Sagittarii	4 $\frac{1}{2}$	1.55	2.3	24 21.7	2 4.5	-11 40.8	-0.5924	.6104	.0585	-12	-85
B. A. C. 6217	6 $\frac{1}{2}$	1.54	1.6	24 58.4	8 32.8	- 5 29.0	-0.2984	.6118	.0381	+ 2	-60
$\lambda$ Sagittarii	3	+1.51	-1.3	-25 29.4	10 53.6	- 3 14.3	+0.1322	.6121	-.0311	+24	-34
B. A. C. 6369	6	1.45	-0.5	25 8.5	17 4.0	+ 2 40.2	-0.3460	.6123	-.0118	- 3	-64
$\gamma$ Sagittarii	2 $\frac{1}{2}$	1.44	+0.1	26 27.2	20 51.4	+ 6 17.8	+0.9333	.6119	+0.0003	+64	+15
B. A. C. 6490	6 $\frac{1}{2}$	1.41	0.1	25 1.4	23 31.6	+ 8 51.2	-0.4727	.6117	.0090	- 9	-74
B. A. C. 6562	6 $\frac{1}{2}$	1.38	0.7	26 7.2	25 3 27.1	-11 23.4	+0.6739	.6108	.0213	+59	- 3
$\psi$ Sagittarii	5	1.38	0.7	25 28.5	4 18.8	-10 33.8	+0.0526	.6108	.0232	+19	-39
B. A. C. 6576	6	+1.37	+9.5	-24 23.7	4 20.2	-10 32.5	-1.0186	.6108	+0.232	-41	-90
$\chi^1$ Sagittarii	6	1.33	0.8	24 45.3	7 54.8	- 7 7.1	-0.5576	.6395	.0346	-12	-81
$\chi^2$ Sagittarii	6 $\frac{1}{2}$	1.33	0.8	24 39.7	7 57.3	- 7 4.7	-0.6488	.6395	.0348	-17	-90
$\chi^3$ Sagittarii	6	1.32	0.8	24 12.6	8 0.6	- 7 1.5	-1.0947	.6395	.0349	-46	-90
$\lambda^1$ Sagittarii	6	1.28	1.2	24 59.8	11 53.3	- 3 18.7	-0.1548	.6383	.0463	+10	-51
$\lambda^2$ Sagittarii	4 $\frac{1}{2}$	1.28	1.3	25 9.8	12 8.0	- 3 4.7	+0.0224	.6083	.0474	+20	-40
B. A. C. 7049	6	+1.02	+2.5	-22 48.8	26 8 5.8	- 7 56.6	-0.7861	.5970	+1.048	-18	-90
17 Capricorni	6	0.95	2.6	21 58.6	14 33.9	- 1 44.3	-0.8906	.5922	.1219	-23	-90
B. A. C. 7197	6	0.95	3.1	23 12.1	15 24.1	- 0 56.0	+0.4383	.5914	.1243	+50	-17
$\chi$ Capricorni	6	0.84	3.3	21 42.3	23 25.4	+ 6 46.3	+0.0119	.5948	.1435	+28	-41
27 Capricorni	6	0.83	3.1	21 4.1	23 49.5	+ 7 9.5	-0.5713	.5848	.1443	- 2	-81
$\phi$ Capricorni	6	0.81	3.2	21 10.8	27 2 16.4	+ 9 30.6	-0.0982	.5820	.1495	+23	-47
33 Capricorni	6	+0.76	+3.5	-21 23.6	5 43.8	-11 9.9	+0.6467	.5797	+1.574	+67	- 6
35 Capricorni	6	0.75	3.6	21 44.8	6 59.2	- 9 57.4	+1.2034	.5788	.1590	+69	+36
37 Capricorni	6	0.69	3.5	20 39.2	10 7.6	- 6 56.2	+0.6136	.5761	.1663	+65	- 8
$\kappa$ Capricorni	4 $\frac{1}{2}$	0.68	3.0	20 2.2	11 3.2	- 6 2.6	+0.1478	.5754	.1631	+38	-33
$\nu$ Capricorni	5	0.63	3.2	19 26.9	13 22.2	- 3 48.9	-0.0522	.5729	.1733	+28	-45
B. A. C. 7550	6	+0.65	+3.5	-20 12.3	13 35.8	- 3 35.8	+0.7518	.5728	+1.734	+68	0

ELEMENTS FOR FACILITATING THE PREDICTION OF OCCULTATIONS OF  
PLANETS AND STARS BY THE MOON.

## MAY.

STAR'S—				AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1872.0. $\Delta\alpha$ $\Delta\delta$	Apparent Declination.	Washington Mean Time.	Hour Angle. $H$	$Y$	$x'$	$y'$	N'n.	S'n.
29 Aqua., <i>mult.</i>	6	+0.54	+2.9	-17 34.8	27 21 44.8	+ 4 15.2	-0.4298	.5659	+1881	+10 -68
56 Aquarii	6	0.36	2.5	15 14.3	28 9 52.8	- 8 2.8	-0.4116	.5560	.2069	+14 -67
71 Aqua., <i>mult.</i>	6	0.26	2.7	14 43.8	17 40.9	- 0 31.0	+0.7239	.5498	.2170	+75 - 3
73 Aquarii	4	0.25	2.7	14 16.0	18 32.3	+ 0 18.7	+0.4365	.5490	.2180	+61 -18
74 Aquarii	6	0.22	2.1	12 17.8	20 19.1	+ 2 1.9	-1.1899	.5479	.2198	-33 -90
75 Aquarii	4	0.08	1.5	9 52.9	29 7 37.3	-11 2.6	-1.1236	.5398	.2311	-26 -90
$\psi^2$ Aquarii	5	+0.08	+1.6	-10 18.6	8 6.8	-10 34.0	-0.5686	.5395	+2315	+ 9 -78
B. A. C. 8214	6	-0.03	1.1	8 10.4	15 58.3	- 2 57.8	-0.9315	.5346	.2374	-11 -90
B. A. C. 8274	6	0.09	1.0	7 5.5	22 13.6	+ 3 5.4	-0.5551	.5314	.2412	+11 -77
30 Piscium	5	0.15	0.8	6 43.5	4 45.7	+ 9 25.1	+0.6521	.5281	.2443	+82 - 7
33 Piscium	5	0.17	0.9	6 25.4	6 25.3	+11 1.6	+0.7451	.5271	.2449	+81 - 2
B. A. C. 17	6	-0.20	+0.7	- 5 57.6	8 52.2	-10 36.1	+0.8638	.5264	+2457	+84 + 4
B. A. C. 81	6	0.28	-0.1	2 55.6	15 53.6	- 3 47.6	-0.5655	.5237	.2474	+12 -77
14 Ceti	6	0.35	0.5	1 12.6	21 23.9	+ 1 32.5	-0.9991	.5220	.2481	-13 -90
15 Ceti	6	0.37	0.5	- 1 12.5	22 40.8	+ 2 47.1	-0.6830	.5217	.2482	+ 6 -89
26 Ceti, <i>mult.</i>	6	0.49	0.8	+ 0 40.8	31 11 39.2	- 8 38.1	+0.5516	.5189	.2474	+76 -13
29 Ceti	6	-0.51	-0.9	+ 1 19.3	13 46.1	- 6 35.0	+0.3973	.5187	+2469	+65 -21
33 Ceti	6	0.52	1.0	1 45.8	15 4.7	- 5 18.8	+0.2556	.5184	.2467	+56 -28
35 Ceti	6	0.53	1.0	1 47.6	16 5.0	- 4 20.2	+0.4711	.5184	.2464	+70 -17
$\gamma$ Piscium	6	0.54	1.1	2 56.4	18 45.3	- 1 44.8	-0.0811	.5182	.2456	+37 -46
B. A. C. 408	6	-0.57	-1.4	+ 4 4.1	21 14.9	+ 0 40.3	-0.6623	.5180	+2449	+ 7 -84

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$\mu$ Piscium	4	-0.60	-1.8	+ 5 28.9	1 1 0.9	+ 4 19.5	-1.2425	.5179	+2434	-32 -85
$\nu$ Piscium	4	0.65	1.4	4 50.3	6 46.4	+ 9 54.7	+0.8339	.5178	.2407	+90 + 4
64 Ceti	6	0.76	1.7	7 58.1	21 57.8	+ 0 38.7	+1.0927	.5194	.2310	+90 +22
$\zeta$ Ceti	4	0.77	1.7	8 14.7	22 47.3	+ 1 26.7	+0.9881	.5194	.2303	+90 +15
B. A. C. 728	6	0.82	2.1	10 15.1	2 3 26.0	+ 5 57.0	-0.0977	.5204	.2264	+36 -44
B. A. C. 741	6	0.81	1.8	9 8.0	4 35.6	+ 7 4.5	+1.3640	.5205	.2255	+90 +54
$\xi$ Arietis	5	-0.82	-2.0	+10 1.7	4 44.4	+ 7 13.1	+0.4366	.5206	+2253	+68 -16
B. A. C. 755	6	0.83	1.9	9 59.3	5 43.2	+ 8 10.1	+0.7019	.5208	.2245	+90 - 2
31 Arietis	5	0.87	2.3	11 53.4	10 38.7	-11 3.3	-0.2448	.5218	.2198	+29 -51
38 Arietis	5	0.88	2.2	11 54.3	14 50.1	- 6 59.6	+0.6527	.5225	.2156	+87 - 3
MERCURY				16 18.7	3 14 12.8	- 8 20.1	+0.6226	.4637	.1631	+85 + 1
B. A. C. 1096	6	1.04	-1.7	17 24.6	15 2.6	- 7 31.9	-0.4158	.5301	.1857	+20 -57
B. A. C. 2154	6	-1.03	+3.2	+24 41.6	7 4 19.9	+ 2 56.7	+0.8314	.5499	+0184	+90 +28
$\epsilon$ Geminorum	3	1.01	3.4	25 15.4	7 15.7	+ 5 46.5	+0.2522	.5497	+0116	+57 - 3
37 Geminor.	6	0.98	3.6	25 32.1	12 26.3	+10 46.6	-0.0272	.5494	-0006	+40 -16
39 Geminor.	6	0.98	3.8	26 14.9	14 0.9	-11 42.1	-0.8217	.5493	.0038	- 7 -64
40 Geminor.	6	0.98	3.8	26 5.2	14 18.9	-11 24.6	-0.6442	.5493	.0043	+ 4 -56
$\omega$ Geminorum	6	-0.95	+3.7	+24 23.8	15 42.4	-10 4.0	+1.2207	.5490	-0079	+90 +59
48 Geminor.	6	0.92	3.9	24 20.5	20 17.4	- 5 38.3	+1.2235	.5484	.0179	+90 +59
52 Geminor.	6	0.92	4.1	25 6.3	7 21 17.9	- 4 39.9	+0.3572	.5483	.0201	+64 + 2
A Geminor.	5	0.88	4.4	25 17.7	8 1 19.6	- 0 46.3	+0.0453	.5475	.0291	+44 -15
B. A. C. 2514	6	0.82	4.5	24 30.6	8 34.6	+ 6 14.2	+0.6461	.5458	.0455	+90 +15
$\epsilon$ Geminorum	6	-0.82	+5.0	+26 5.3	10 48.6	+ 8 23.6	-1.2123	.5453	-0503	-42 -64
$\kappa$ Gemi., <i>mult.</i>	3	0.80	4.7	24 42.2	11 0.0	+ 8 34.6	+0.3154	.5453	.0506	+61 - 3
$\omega^2$ Cancri	6	0.73	5.0	25 26.4	19 0.7	- 7 40.7	-0.9779	.5428	.0677	-18 -65
$\lambda$ Cancri	6	0.66	5.0	24 25.5	9 3 51.4	+ 0 52.6	+0.5312	.5398	.0682	+12 -54
$\nu^2$ Cancri	6	0.63	5.4	24 34.1	7 40.3	+ 4 34.0	-1.0347	.5385	.0940	-22 -66
$\nu^3$ Cancri	6	-0.62	+5.4	+24 30.7	9 3.0	+ 5 54.0	-1.1028	.5379	-0964	-28 -66
32 Cancri	6	0.60	5.5	24 31.2	9 45.5	+ 6 35.1	-1.1800	.5378	.0980	-36 -66
$\gamma$ Cancri	4	0.53	4.8	21 55.7	14 43.3	+11 23.3	+1.1866	.5356	.1077	+90 +46
$\xi$ Cancri	5	0.42	5.1	22 33.8	10 3 17.4	- 0 26.6	-1.0167	.5306	.1035	-19 -63
79 Cancri	6	-0.41	+5.1	+22 30.9	3 46.4	+ 0 1.5	-1.0275	.5305	-1316	-21 -63

## ELEMENTS FOR FACILITATING THE PREDICTION OF OCCULTATIONS OF PLANETS AND STARS BY THE MOON.

JUNE.

STAR'S—				AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Magn.	Red'ns from 1872.0. $\Delta\alpha$ $\Delta\delta$	Apparent Declination.	Washington Mean Time.	Hour Angle. $H$	$Y$	$x'$	$y'$	N'n.	S'n.
B. A. C. 3138	6	-0.38	+5.0	+21° 48.6	<sup>d</sup> 10 <sup>h</sup> 5 <sup>m</sup> 23.2	+ 1 35.2	-0.4598	.5297	-1346	+16 -54
B. A. C. 3292	6½	0.26	4.8	20 52.6	17 52.9	-10 18.4	-1.2342	.5246	.1551	-39 -69
$\eta$ Leonis	3½	0.10	3.7	17 23.2	11 8 13.4	+ 3 35.8	+0.2398	.5193	.1763	+56 -21
42 Leonis	6	-0.03	3.1	15 37.2	15 38.8	+10 47.7	+0.8366	.5168	.1865	+90 +11
B. A. C. 3579	6	+0.02	2.7	14 59.8	19 14.2	- 9 43.2	+0.8439	.5156	.1909	+90 +10
$\iota$ Leonis	6	0.03	2.7	14 47.6	20 58.8	- 8 1.8	+0.7321	.5150	.1930	+90 + 4
$k$ Leonis	6	+0.11	+2.5	+14 52.2	12 4 20.7	- 0 52.8	-0.8061	.5133	-.2016	- 3 -75
$\epsilon$ Leonis, <i>mult.</i>	4	0.33	+1.0	11 14.1	23 58.1	- 5 50.0	-0.9865	.5093	.2210	-13 -79
$\omega$ Virginis	6½	0.40	-0.1	8 50.5	13 7 38.6	+ 1 37.2	-0.1108	.5087	.2273	+36 -46
$\xi$ Virginis	5	0.44	0.0	8 58.2	11 14.1	+ 5 6.5	-1.0686	.5087	.2298	-18 -81
$\nu$ Virginis	4½	0.43	0.7	7 14.8	11 32.8	+ 5 24.6	+0.7226	.5086	.2301	+90 - 2
$\pi$ Virginis	4½	0.51	0.7	7 19.7	19 27.2	-10 54.6	-1.2042	.5090	.2352	-29 -83
B. A. C. 4104	6½	+0.56	-1.7	+ 4 46.0	14 1 7.7	- 5 24.0	+0.2068	.5096	-.2382	+53 -30
$\epsilon$ Virginis	5	0.60	2.1	4 1.5	5 42.0	- 0 57.7	-0.0936	.5101	.2404	+36 -46
B. A. C. 4254	6	0.70	2.8	+ 2 33.5	15 5.0	+ 8 8.8	-0.7986	.5123	.2438	- 1 -71
65 Virginis	6	0.94	5.4	- 4 15.3	15 14 0.8	+ 6 23.5	+0.7649	.5211	.2461	+80 - 1
66 Virginis	6	0.94	5.5	4 20.8	14 37.2	+ 6 58.8	+0.8672	.5214	.2461	+86 + 5
$\beta$ Virginis	5	0.96	5.8	5 35.7	18 19.6	+10 34.4	+1.1043	.5232	.2456	+85 +21
80 Virginis	6	+0.99	-5.5	- 4 44.7	20 5.5	-11 43.0	-0.2185	.5243	-.2452	+30 -54
B. A. C. 4572	6	1.03	5.4	4 51.3	16 0 13.7	- 7 42.5	-1.1135	.5267	.2441	-22 -90
B. A. C. 4647	6	1.10	6.2	7 25.8	5 36.7	- 2 29.6	+0.2546	.5304	.2422	+54 -28
94 Virginis	6	1.16	6.6	8 16.9	11 2.3	+ 2 45.7	-0.1699	.5339	.2396	+31 -51
95 Virginis	6	1.17	6.6	8 42.2	11 14.5	+ 2 57.4	+0.2171	.5340	.2395	+52 -30
96 Virginis	6½	1.17	7.0	9 43.7	12 18.9	+ 3 59.8	+1.0191	.5346	.2390	+81 +15
$\kappa$ Virginis	4½	+1.19	-6.9	- 9 40.7	14 9.6	+ 5 46.9	+0.5271	.5364	-.2379	+71 -14
2 Libræ	6	1.24	7.2	11 7.8	19 5.7	+10 33.3	+0.8529	.5400	.2346	+79 + 5
$\mu$ Libræ	5	1.36	7.5	13 37.0	17 6 56.5	- 1 59.6	+0.6717	.5502	.2242	+76 - 6
$\nu$ Libræ	6	1.44	7.9	15 45.7	14 36.4	+ 5 24.3	+1.1628	.5573	.2154	+74 +28
$\sigma$ Libræ	6	1.52	7.2	15 5.2	20 52.5	+11 27.0	-0.8457	.5632	.2071	-11 -90
$\zeta$ Libræ	4	1.53	7.4	16 16.2	23 57.3	- 9 34.9	-0.2802	.5661	.2027	+19 -58
$\zeta^2$ Libræ	7	+1.55	-7.5	-17 0.0	18 0 30.6	- 9 2.8	+0.3423	.5669	-.2016	+53 -23
B. A. C. 5090	7	1.55	7.4	16 48.8	0 46.0	- 8 47.9	+0.1036	.5669	.2014	+39 -36
$\zeta^3$ Libræ	6	1.54	7.3	16 10.3	0 59.0	- 8 35.4	-0.5882	.5671	.2011	+ 3 -81
$\zeta^4$ Libræ	6	1.56	7.3	16 25.1	1 56.0	- 7 40.4	-0.5281	.5681	.1996	+ 6 -76
$\lambda$ Libræ	6	1.65	7.4	19 47.1	10 23.2	+ 0 28.0	+1.2252	.5766	.1849	+70 +37
$\beta^1$ Scorpïi	2	1.69	7.0	19 27.3	15 19.7	+ 5 13.2	+0.0014	.5812	.1760	+31 -42
$\beta^2$ Scorpïi	5½	+1.69	-7.0	-19 27.1	15 19.9	+ 5 13.4	-0.0028	.5812	-.1760	+31 -42
$\omega^1$ Scorpïi	4½	1.71	7.1	20 19.3	15 52.0	+ 5 44.2	+0.7739	.5817	.1747	+70 + 2
$\omega^2$ Scorpïi	4½	1.72	7.2	20 31.4	16 6.1	+ 5 57.8	+0.9335	.5820	.1743	+70 +12
$\nu^1$ Scorpïi	7	1.72	6.8	19 7.1	17 58.4	+ 7 45.7	-0.7925	.5838	.1705	-12 -90
$\nu^2$ Scorpïi	4	1.72	6.7	19 7.7	17 58.7	+ 7 46.0	-0.7839	.5839	.1704	-12 -90
B. A. C. 5395	6	1.76	7.0	21 4.4	18 37.1	+ 8 22.9	+1.0495	.5845	.1690	+69 +31
$\psi$ Ophiuchi	5	+1.77	-6.4	-19 44.3	22 47.3	-11 36.5	-0.9687	.5884	-.1601	-24 -90
$\omega$ Ophiuchi	5	1.82	6.3	21 11.5	19 1 54.9	- 8 36.4	-0.0103	.5914	.1531	+28 -42
22 Ophiuchi	6½	1.90	5.7	23 18.1	10 38.7	- 0 13.7	+0.8364	.5991	.1317	+67 + 6
24 Ophiuchi	6½	1.90	5.6	22 56.8	11 23.9	+ 0 29.6	+0.3863	.5999	.1296	+47 -20
39 Oph., <i>mult.</i>	6	1.97	4.6	24 8.8	19 22.0	+ 8 7.9	+0.6203	.6062	.1081	+61 - 6
B. A. C. 5831	6	1.97	4.6	23 55.9	19 24.1	+ 8 9.9	+0.4040	.6062	.1081	+46 -19
$\theta$ Ophiuchi	3½	+1.98	-4.6	-24 52.2	20 50.3	+ 9 32.4	+1.1781	.6070	-.1044	+65 +36
$\delta$ Ophiuchi	5	1.98	4.3	24 3.4	22 28.4	+11 6.4	+0.2076	.6081	.0996	+34 -30
$\epsilon^2$ Ophiuchi	5	1.98	4.1	23 51.7	20 0 20.7	-11 6.0	-0.1633	.6093	.0948	+14 -52
63 Ophiuchi	6½	2.03	3.0	24 51.6	8 55.4	- 2 53.4	+0.1172	.6143	.0698	+27 -35
4 Sagittari	5	2.02	2.7	23 48.1	10 43.3	- 1 10.1	-1.0418	.6152	.0630	-39 -90
7 Sagittari	6	+2.02	-2.5	-24 16.8	11 49.1	- 0 7.1	-0.6394	.6157	-.0597	-14 -90



ELEMENTS FOR FACILITATING THE PREDICTION OF OCCULTATIONS OF  
PLANETS AND STARS BY THE MOON.

JUNE.

STAR'S—				AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'n's from 1872.0. $\Delta\alpha$ $\Delta\delta$	Apparent Declination.	Washington Mean Time.	Hour Angle. $H$	$Y$	$x'$	$y'$	N'n.	S'n.
9 Sagittarii	4½	+2.03	-25° 21.7	20 12 11.2	+ 0 13.9	-0.5814	+6160	-0588	-11	-84
B. A. C. 6217	6½	2.05	1.6 24 58.4	18 32.5	+ 6 18.7	-0.2878	.6182	.0382	+ 3	-60
λ Sagittarii	3	2.07	1.3 25 20.4	20 50.6	+ 8 30.8	+0.1387	.6186	.0310	+25	-34
24 Sagittarii	6	2.05	1.0 24 7.5	22 59.6	+10 34.2	+1.2274	.6192	.0242	+66	+48
B. A. C. 6369	6	2.06	-0.4 25 8.5	21 2 53.2	- 9 42.5	-0.3324	.6196	-0116	+ 2	-63
σ Sagittarii	2½	2.08	+0.2 26 27.2	6 35.3	- 6 10.2	+0.9343	.6200	+0.008	+64	+15
B. A. C. 6490	6½	+2.05	+0.6 -25 1.4	9 11.6	- 3 40.8	-0.4553	.6197	+0.087	- 9	-72
B. A. C. 6562	6½	2.04	1.1 26 7.2	13 1.2	- 0 1.2	+0.6786	.6193	.0214	+60	- 2
ψ Sagittarii	5	2.05	1.2 25 28.5	13 51.6	+ 0 47.0	+0.0652	.6193	.0243	+20	-38
B. A. C. 6576	6	2.04	1.1 24 23.7	13 53.0	+ 0 48.3	-0.9927	.6192	.0243	-39	-90
χ¹ Sagittarii	6	2.02	1.6 24 45.3	17 22.0	+ 4 8.2	-0.5199	.6189	.0364	-10	-78
χ² Sagittarii	6½	2.02	1.6 24 39.7	17 24.4	+ 4 10.5	-0.6262	.6184	.0364	-15	-89
χ³ Sagittarii	6	+2.02	+1.5 -24 12.6	17 27.6	+ 4 13.5	-1.0664	.6184	+0.362	-44	-90
λ¹ Sagittarii	6	2.00	2.3 24 59.8	21 13.9	+ 7 49.9	-0.1372	.6175	.0476	+11	-50
λ² Sagittarii	4½	2.00	2.3 25 9.8	21 28.2	+ 8 3.6	+0.0377	.6173	.0490	+21	-39
B. A. C. 7049	6	1.82	4.5 22 48.8	22 16 50.3	+ 2 35.8	-0.7525	.6069	.1072	-16	-90
17 Capricorni	6	1.77	5.4 21 58.6	23 6.0	+ 8 35.7	-0.8527	.6027	.1243	-20	-90
B. A. C. 7197	6	1.77	5.7 23 12.0	23 54.6	+ 9 22.3	+0.4559	.6020	.1264	+51	-16
χ Capricorni	6	+1.68	+6.2 -21 42.3	23 7 40.4	- 7 11.0	+0.0387	.5955	+1.463	+30	-40
27 Capricorni	6	1.68	6.1 21 4.0	8 3.7	- 6 48.6	-0.5354	.5954	.1470	0	-78
φ Capricorni	6	1.65	6.4 21 10.8	10 25.8	- 4 32.2	-0.0688	.5928	.1533	+25	-46
33 Capricorni	6	1.62	6.8 21 23.5	13 46.4	- 1 19.6	+0.6659	.5902	.1605	+68	- 4
35 Capricorni	6	1.61	6.9 21 44.8	14 59.4	- 0 9.5	+1.2145	.5891	.1631	+68	+37
37 Capricorni	6	1.56	7.0 20 39.1	18 1.7	+ 2 45.6	+0.6347	.5863	.1696	+66	- 7
ε Capricorni	4½	+1.54	+7.0 -20 2.2	18 55.4	+ 3 37.3	+0.1765	.5853	+1.715	+40	-32
κ Capricorni	5	1.52	7.1 19 26.8	21 9.9	+ 5 46.6	-0.0196	.5835	.1761	+30	-43
B. A. C. 7550	6	1.53	7.3 20 12.2	22 23.1	+ 6 59.2	+0.7723	.5830	.1770	+70	+ 2
20 Aqua., mult.	6	1.40	7.2 17 34.7	24 5 16.5	-10 25.5	-0.3891	.5760	.1912	+12	-66
56 Aquarii	6	1.24	7.4 15 14.2	17 2.1	+ 0 54.1	-0.3673	.5648	.2104	+16	-64
τ¹ Aqua., mult.	6	1.15	7.8 14 43.7	25 0 36.7	+ 8 12.4	+0.7544	.5581	.2204	+73	- 1
τ² Aquarii	4	+1.14	+7.7 -14 15.9	1 26.7	+ 9 0.7	+0.4713	.5573	+2.213	+63	-17
74 Aquarii	6	1.10	7.2 12 17.7	3 10.4	+10 40.7	-1.1327	.5558	.2233	-28	-90
ψ¹ Aquarii	4½	0.96	6.8 9 47.0	13 14.3	- 3 36.2	-1.3829	.5478	.2334	-64	-90
ψ² Aquarii	4½	0.97	6.8 9 52.8	14 10.8	- 2 41.6	-1.0649	.5469	.2342	-21	-90
ψ³ Aquarii	5	0.96	7.0 10 18.5	14 39.6	- 2 13.8	-0.5171	.5464	.2347	+12	-74
B. A. C. 8214	6½	0.86	6.7 8 10.8	22 19.9	+ 5 11.3	-0.8744	.5410	.2402	- 8	-90
B. A. C. 8274	6½	+0.78	+6.6 - 7 5.4	26 4 27.0	+11 6.3	-0.5015	.5364	+2.438	+14	-72
30 Piscium	5	0.70	6.6 6 43.4	10 51.4	- 6 41.7	+0.6939	.5328	.2465	+83	- 5
33 Piscium	5	0.68	6.6 6 25.3	12 29.2	- 5 7.0	+0.7865	.5319	.2471	+74	0
B. A. C. 17	6½	0.66	6.4 5 57.5	14 53.4	- 2 47.4	+0.9047	.5308	.2478	+84	+ 7
B. A. C. 81	6½	0.56	5.6 2 55.5	21 47.9	+ 3 54.0	-0.5106	.5271	.2492	+15	-73
14 Ceti	6½	0.51	5.1 1 12.5	27 3 13.6	+ 9 9.6	-0.9410	.5251	.2496	-10	-90
15 Ceti	6½	+0.51	+5.1 - 1 12.4	4 29.5	+10 23.2	-0.6275	.5245	+2.496	+ 9	-83
26 Ceti, mult.	6½	0.34	4.7 + 0 40.9	17 19.4	- 1 10.5	+0.5990	.5206	.2481	+83	-10
29 Ceti	6½	0.31	4.6 1 19.4	19 25.2	+ 0 51.5	+0.4457	.5200	.2475	+68	-18
33 Ceti	6	0.30	4.5 1 45.9	20 43.2	+ 2 7.1	+0.3048	.5198	.2472	+59	-25
35 Ceti	6½	0.29	4.5 1 47.7	21 43.1	+ 3 5.2	+0.5192	.5195	.2468	+74	-14
f Piscium	6	0.26	4.2 2 56.4	28 0 22.2	+ 5 39.5	-0.0305	.5193	.2463	+40	-43
B. A. C. 408	6½	+0.25	+3.7 + 4 4.2	2 50.9	+ 8 3.7	-0.6097	.5187	+2.450	+10	-80
μ Piscium	4½	0.20	3.3 5 29.0	6 35.7	+11 41.7	-1.1877	.5182	.2434	-27	-85
ν Piscium	4½	0.14	3.6 4 50.4	12 24.8	- 6 39.5	+0.8804	.5179	.2406	+90	+ 7
64 Ceti	6½	+0.01	3.0 7 58.2	29 3 30.2	+ 7 58.5	+1.1376	.5181	.2301	+90	+26
ε¹ Ceti	6½	-0.02	3.0 8 14.8	4 19.7	+ 8 46.6	+1.0330	.5182	.2297	+90	+18
B. A. C. 728	6½	-0.07	+2.4 +10 15.2	8 58.8	-10 42.8	-0.0520	+5186	+2.256	+39	-42

## ELEMENTS FOR FACILITATING THE PREDICTION OF OCCULTATIONS OF PLANETS AND STARS BY THE MOON.

### JUNE.

STAR'S—					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	R.d'us from 1872.0. $\Delta\alpha$	$\Delta\delta$	Apparent Declination.	Washington Mean Time.	Hour Angle. $H$	$Y$	$x'$	$y'$	N'n.	S'n.
$\xi$ Arietis	5 $\frac{1}{2}$	-0.08	+2.4	+10 $^{\circ}$ 1.8	29 10 17.4	- 9 26.6	+0.4813	+5188	+2245	+71	-14
B. A. C. 755	6	0.09	2.4	9 59.3	11 16.4	- 8 29.3	+0.7461	.5189	.2236	+90	+ 1
31 Arietis	6	0.13	1.9	11 53.5	16 12.7	- 3 42.0	-0.2011	.5196	.2192	+31	-49
38 Arietis	5	0.17	2.1	11 54.4	20 25.0	+ 0 22.7	+0.6942	.5202	.2154	+90	- 1
B. A. C. 1096	6 $\frac{1}{2}$	-0.37	+1.0	+17 24.7	30 20 46.2	- 0 0.9	-0.3821	+5272	+1841	+21	-55

### JULY.

B. A. C. 1242	6	-0.48	+1.0	+19 50.4	1 9 52.0	-11 19.8	-0.7456	+5319	+1641	0	-69
$\omega^1$ Tauri	6	0.50	1.0	19 16.1	13 45.5	- 7 33.7	+0.5042	.5332	.1578	+75	- 4
$\omega^2$ Tauri	5 $\frac{1}{2}$	0.53	1.1	20 15.7	17 37.8	- 3 48.9	+0.0173	.5346	.1510	+43	-29
53 Tauri	6 $\frac{1}{2}$	0.52	1.0	20 49.9	18 39.1	- 2 49.5	-0.4520	.5348	.1493	+17	-55
56 Tauri	6	0.52	1.0	21 27.8	18 43.3	- 2 45.4	-1.1327	.5349	.1492	-28	-69
$\kappa^3$ Tauri	6 $\frac{1}{2}$	0.55	1.0	21 54.3	21 28.5	- 0 5.6	-1.2139	.5359	.1443	-37	-68
B. A. C. 1373	6	-0.55	+1.1	+21 20.0	22 43.7	+ 1 7.2	-0.4084	.5363	+1422	+19	-51
$\tau$ Tauri	4 $\frac{1}{2}$	0.59	1.0	22 42.5	2 5 26.7	+ 7 37.1	-1.0032	.5389	.1297	-18	-68
99 Tauri	6 $\frac{1}{2}$	0.64	1.2	23 44.8	12 44.1	- 9 19.7	-1.2485	.5409	.1159	-45	-66
103 Tauri	6	0.67	1.3	24 5.6	17 32.3	- 4 41.0	-1.0982	.5425	.1062	-27	-66
118 Tauri	6	0.69	1.5	25 2.6	3 3 19.9	+ 4 47.2	-1.2031	.5450	.0865	-40	-67
121 Tauri	6	0.70	1.9	23 57.2	6 12.8	+ 7 34.4	+0.2399	.5458	.0802	+56	-10
B. A. C. 1774	6 $\frac{1}{2}$	-0.71	+2.0	+23 14.9	7 59.0	+ 9 17.0	+1.1572	.5461	+0.763	+90	+47
132 Tauri	5 $\frac{1}{2}$	0.71	2.1	24 31.4	12 26.3	-10 24.7	+0.0677	.5471	+0.664	+46	-24
$\nu^2$ Cancri	6 $\frac{1}{2}$	0.61	4.7	24 34.1	6 13 58.5	-11 20.3	-1.0960	.5395	-.0948	-27	-66
$\nu^3$ Cancri	6	0.60	4.8	24 30.7	15 21.3	-10 0.1	-1.1641	.5391	.0972	-34	-66
32 Cancri	6	0.60	4.8	24 31.1	16 3.7	- 9 19.1	-1.2425	.5388	.0988	-45	-66
$\gamma$ Cancri	4 $\frac{1}{2}$	0.53	4.4	21 55.7	21 1.6	- 4 31.0	+1.1228	.5368	.1085	+90	+40
$\xi$ Cancri	5	-0.48	+5.0	+22 33.8	7 9 35.8	+ 7 39.2	-1.0947	.5317	-.1318	-26	-68
79 Cancri	6	0.47	5.0	22 30.9	10 5.0	+ 8 7.5	-1.1061	.5316	.1325	-27	-68
B. A. C. 3138	6	0.46	4.8	21 48.6	11 41.7	+ 9 41.1	-0.5383	.5308	.1355	+12	-59
B. A. C. 3292	6 $\frac{1}{2}$	0.37	4.9	20 52.6	8 0 12.5	- 2 11.3	-1.3262	.5255	.1560	-61	-69
$\eta$ Leonis	3 $\frac{1}{2}$	0.24	4.2	17 23.2	14 35.5	+11 45.4	+0.1414	.5194	.1773	+50	-26
42 Leonis	6	0.19	3.7	15 37.2	22 3.0	- 5 0.5	+0.7355	.5165	.1869	+90	+ 4
B. A. C. 3579	6	-0.18	+3.4	+14 59.8	9 1 39.6	- 1 30.4	+0.7403	.5151	-.1915	+90	+ 4
$i$ Leonis	6	0.16	3.4	14 47.6	3 24.8	+ 0 11.7	+0.6268	.5144	.1936	+85	- 3
$k$ Leonis	6	-0.10	3.3	14 52.2	10 49.9	+ 7 23.8	-0.9245	.5119	.2020	-10	-75
$\omega$ Leonis, mult.	4	+0.07	2.2	11 14.1	10 6 39.0	+ 2 38.6	-1.1200	.5072	.2206	-23	-79
$\omega$ Virginis	6 $\frac{1}{2}$	0.13	1.5	8 50.6	14 25.6	+10 11.8	-0.2416	.5058	.2264	+29	-53
$\xi$ Virginis	5	0.15	1.5	8 58.2	18 4.3	-10 15.7	-1.2089	.5056	.2288	-30	-81
$\nu$ Virginis	4 $\frac{1}{2}$	+0.17	+1.0	+ 7 14.8	18 23.3	- 9 57.2	+0.5970	.5056	-.2291	+80	- 9
$\pi$ Virginis	4 $\frac{1}{2}$	0.24	+0.8	7 19.7	11 2 25.4	- 2 8.9	-1.3496	.5049	.2337	-46	-83
B. A. C. 4104	6 $\frac{1}{2}$	0.30	-0.2	4 46.0	8 12.0	+ 3 27.9	+0.0722	.5062	.2364	+46	-37
$c$ Virginis	5	0.33	0.5	4 1.5	12 51.7	+ 7 59.5	-0.2323	.5052	.2383	+29	-54
B. A. C. 4254	6	0.44	1.1	+ 2 33.5	22 26.4	- 6 42.1	-0.9471	.5069	.2414	-10	-88
65 Virginis	6	0.67	3.7	- 4 15.3	12 21 55.9	- 7 53.6	+0.6362	.5138	.2427	+82	- 8
66 Virginis	6	+0.67	-3.9	- 4 29.7	22 33.3	- 7 17.3	+0.7396	.5142	-.2426	+83	- 3
$\rho$ Virginis	5	0.71	4.3	5 35.7	13 2 21.8	- 3 35.6	+0.9811	.5159	.2419	+85	+12
80 Virginis	6	0.74	4.0	4 44.6	4 10.6	- 1 50.1	-0.3583	.5168	.2415	+22	-63
B. A. C. 4572	6	0.79	4.3	4 51.3	8 25.7	+ 2 17.3	-1.2642	.5193	.2403	-36	-90
B. A. C. 4647	6	0.85	4.9	7 25.7	13 57.8	+ 7 39.3	+0.1241	.5222	.2383	+47	-35
94 Virginis	6	0.91	5.1	8 16.9	19 32.8	-10 56.0	-0.3036	.5259	.2356	+24	-59
95 Virginis	6	+0.93	-5.3	- 8 42.2	19 45.4	-10 43.9	+0.0888	.5260	-.2355	+44	-37
96 Virginis	6 $\frac{1}{2}$	0.94	5.6	9 43.7	20 51.7	- 9 39.6	+0.9020	.5267	.2349	+81	+ 7
$\kappa$ Virginis	4 $\frac{1}{2}$	0.96	5.7	9 40.7	22 45.6	- 7 49.3	+0.4043	.5281	.2337	+63	-20
2 Libræ	6	1.03	6.1	11 7.8	14 3 50.4	- 2 54.1	+0.7376	.5317	.2304	+78	- 2
$\mu$ Libræ	5	+1.15	-6.6	-13 37.0	16 2.0	+ 8 53.8	+0.5618	+5415	-.2201	+70	-12

ELEMENTS FOR FACILITATING THE PREDICTION OF OCCULTATIONS OF  
PLANETS AND STARS BY THE MOON.

JULY.

STAR'S—				AT CONJUNCTION IN R. A.							Limiting Parallels.	
Name.	Mag.	Red'ns from 1872.0. $\Delta\alpha$ $\Delta\delta$		Apparent Declination.	Washington Mean Time.	Hour Angle. $H$	$Y$	$x'$	$y'$	N'n.	S'n.	
$\nu^1$ Libræ	5	+1.29	-7.1	-15 45.7	14 23 55.3	- 7 28.8	+1.0654	+5485	-2115	+74	+20	
$\nu^2$ Libræ	6	1.29	7.2	15 59.3	15 0 0.3	- 7 24.0	+1.2820	.5485	.2115	+74	+41	
$\sigma^1$ Libræ	6	1.37	6.8	15 5.2	6 21.9	- 1 15.5	-0.9634	.5549	.2031	-18	-90	
$\zeta^1$ Libræ	4	1.42	7.0	16 16.2	9 31.7	+ 1 47.6	-0.3879	.5580	.1987	+14	-65	
$\zeta^2$ Libræ	7	1.42	7.2	16 59.9	10 3.8	+ 2 18.5	+0.2500	.5582	.1981	+47	-28	
B. A. C. 5099	7	1.43	7.1	16 58.8	10 21.8	+ 2 36.0	+0.1715	.5589	.1973	+43	-32	
$\zeta^3$ Libræ	6	+1.43	-6.9	-16 10.2	10 35.2	+ 2 48.9	-0.6985	.5589	-.1971	- 3	-90	
$\zeta^4$ Libræ	6	1.45	6.9	16 25.1	11 33.7	+ 3 45.2	-0.6367	.5598	.1957	0	-86	
$\lambda$ Libræ	6	1.59	7.4	19 47.1	20 14.1	-11 53.1	+1.1452	.5641	.1819	+70	+28	
$\beta^1$ Scorpïi	2	1.64	7.0	19 27.3	16 1 18.0	- 7 0.4	-0.0870	.5731	.1727	+26	-47	
$\beta^2$ Scorpïi	5	1.64	7.0	19 27.1	1 18.2	- 7 0.2	-0.0912	.5732	.1727	+26	-48	
$\omega^1$ Scorpïi	4	1.66	7.3	20 19.3	1 51.0	- 6 28.7	+0.6945	.5741	.1714	+70	- 3	
$\omega^2$ Scorpïi	4	+1.66	-7.3	-20 31.4	2 5.4	- 6 14.8	+0.8559	.5742	-.1713	+70	+ 9	
$\nu^1$ Scorpïi	7	1.66	6.7	19 7.1	4 0.3	- 4 24.3	-0.8812	.5764	.1673	-18	-90	
$\nu^2$ Scorpïi	4	1.66	6.7	19 7.7	4 0.7	- 4 23.9	-0.8776	.5764	.1673	-17	-90	
B. A. C. 5395	6	1.69	7.1	21 4.4	4 40.0	- 3 46.1	+0.9759	.5772	.1658	+69	+15	
$\psi$ Ophiuchi	5	1.74	6.5	19 44.3	8 55.8	+ 0 20.0	-1.0580	.5813	.1572	-31	-90	
$\phi$ Ophiuchi	5	1.78	6.7	21 11.5	12 7.4	+ 3 24.2	-0.0865	.5841	.1504	+24	-47	
22 Ophiuchi	6	+1.93	-6.3	-23 18.1	21 1.5	+11 57.2	+0.7775	.5929	-.1295	+67	+ 3	
24 Ophiuchi	6	1.94	6.1	22 56.8	21 47.5	-11 18.6	+0.3246	.5939	.1274	+44	-24	
39 Ophiuchi	6	2.05	5.5	24 8.8	17 5 53.4	- 3 32.5	+0.5699	.6008	.1065	+57	- 9	
B. A. C. 5831	6	2.05	5.5	23 55.9	5 55.6	- 3 30.4	+0.5321	.6008	.1063	+43	-22	
$\theta$ Ophiuchi	3	2.05	5.4	24 52.2	7 23.0	- 2 6.6	+1.1329	.6021	.1019	+65	+31	
$\delta$ Ophiuchi	5	2.09	5.0	24 3.6	9 2.5	- 0 31.3	+0.1582	.6032	.0979	+32	-33	
$\epsilon^1$ Ophiuchi	5	+2.09	-4.8	-23 51.7	10 56.2	+ 1 17.7	-0.2144	.6048	-.0925	+11	-55	
63 Ophiuchi	6	2.19	3.8	24 51.6	19 36.6	+ 9 36.0	+0.0812	.6111	.0668	+25	-37	
4 Sagittarii	5	2.19	3.2	23 48.2	21 25.5	+11 20.3	-1.0797	.6122	.0612	-42	-90	
7 Sagittarii	6	2.22	3.2	24 16.8	22 31.8	-11 36.2	-0.6733	.6131	.0606	-16	-90	
9 Sagittarii	4	2.23	3.1	24 21.7	22 54.1	-11 14.9	-0.6155	.6131	.0571	-13	-88	
B. A. C. 6217	6	2.30	2.3	24 58.4	18 5 17.8	- 5 7.8	-0.3117	.6162	.0373	+ 2	-61	
$\lambda$ Sagittarii	3	+2.33	-2.0	-25 29.4	7 36.7	- 2 54.9	+0.1194	.6172	-.0294	+23	-35	
B. A. C. 6369	6	2.36	0.9	25 8.5	13 40.0	+ 2 52.5	-0.3442	.6192	-.0099	- 3	-63	
$\sigma$ Sagittarii	2	2.40	-0.4	26 27.2	17 22.2	+ 6 24.9	+0.5273	.6199	+0.025	+64	+14	
B. A. C. 6490	6	2.39	+0.1	25 1.4	19 58.4	+ 8 54.2	-0.4575	.6200	.0104	- 9	-72	
B. A. C. 6562	6	2.43	0.7	26 7.2	23 47.4	-11 26.9	+0.6300	.6203	.0231	+59	- 2	
$\psi$ Sagittarii	5	2.42	0.9	25 28.5	19 0 37.6	-10 38.9	+0.0689	.6203	.0260	+20	-38	
B. A. C. 6576	6	+2.41	+0.9	-24 23.7	0 38.9	-10 37.7	-0.9867	.6203	+0.260	-38	-90	
$\chi^1$ Sagittarii	6	2.41	1.6	24 45.3	4 7.0	- 7 18.7	-0.5258	.6203	.0370	-10	-78	
$\chi^2$ Sagittarii	6	2.41	1.6	24 39.7	4 9.4	- 7 16.4	-0.6156	.6204	.0370	-15	-88	
$\chi^3$ Sagittarii	6	2.40	1.7	24 12.6	4 12.6	- 7 13.4	-1.0544	.6204	.0372	-42	-90	
$\lambda^1$ Sagittarii	6	2.42	2.2	24 59.8	7 57.5	- 3 38.3	-0.1222	.6197	.0495	+12	-49	
$\lambda^2$ Sagittarii	4	2.42	2.3	25 9.8	8 11.7	- 3 24.8	+0.0524	.6197	.0501	+22	-39	
B. A. C. 7049	6	+2.40	+5.6	-22 48.8	20 3 20.6	- 9 5.7	-0.7032	.6126	+1.091	-13	-90	
17 Capricorni	6	2.35	6.3	21 58.5	9 30.0	- 3 12.1	-0.7925	.6083	.1274	-17	-90	
B. A. C. 7197	6	2.35	6.6	23 12.0	10 17.8	- 2 26.3	+0.5063	.6080	.1289	+55	-13	
$\chi$ Capricorni	6	2.31	7.8	21 42.3	17 54.4	+ 4 51.2	+0.1040	.6026	.1492	+33	-36	
27 Capricorni	6	2.31	7.8	21 4.0	18 17.2	+ 5 13.0	-0.4634	.6024	.1500	+ 4	-72	
$\phi$ Capricorni	6	2.30	8.0	21 10.7	20 36.3	+ 7 26.4	+0.0018	.6002	.1562	+28	-42	
33 Capricorni	6	+2.28	+8.4	-21 23.5	23 52.4	+10 34.5	+0.7333	.5977	+1.639	+69	- 1	
35 Capricorni	6	2.27	8.7	21 44.7	21 1 3.7	+11 42.9	+1.2776	.5968	.1666	+69	+46	
37 Capricorni	6	2.24	9.1	20 39.1	4 1.7	- 9 26.3	+0.7088	.5943	.1733	+70	- 2	
$\epsilon$ Capricorni	4	2.23	9.0	20 2.1	4 54.1	- 8 35.9	+0.2570	.5933	.1752	+44	-27	
$\kappa$ Capricorni	5	2.20	9.2	19 26.8	7 5.3	- 6 30.0	+0.0663	.5916	.1799	+35	-38	
B. A. C. 7550	6	+2.21	+9.5	-20 12.2	7 18.2	- 6 17.7	+0.8488	+5914	+1.803	+70	+ 6	

## ELEMENTS FOR FACILITATING THE PREDICTION OF OCCULTATIONS OF PLANETS AND STARS BY THE MOON.

JULY.

STAR'S—					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1872.0.		Apparent Declination.	Washington Mean Time.	Hour Angle. H	Y	x'	y'	N'n.	S'n.
		$\Delta\alpha$	$\Delta\delta$								
29 Aquar., <i>mult.</i>	6	+2.11	+10.0	-17° 34.6	21 14 59.3	+ 1 5.3	-0.2863	.5843	+1957	+18	-59
56 Aquarii	6	1.99	10.9	15 14.2	22 2 25.0	-11 55.1	-0.2481	.5737	.2153	+22	-56
$\tau^1$ Aquar., <i>mult.</i>	6	1.92	11.4	14 43.6	9 45.9	- 4 50.4	+0.8672	.5674	.2244	+76	+ 6
$\tau^2$ Aquarii	4	1.91	11.4	14 15.8	10 34.4	- 4 3.6	+0.5894	.5666	.2263	+71	-10
74 Aquarii	6	1.88	10.9	12 17.6	12 15.0	- 2 26.8	-0.9883	.5652	.2282	-17	-90
$\psi^1$ Aquarii	4½	+1.75	+11.1	- 9 46.9	22 0.1	+ 6 57.5	-1.2221	.5571	+2384	-35	-90
$\psi^2$ Aquarii	4½	1.74	11.2	9 52.7	22 54.9	+ 7 50.4	-0.9078	.5562	.2393	-10	-90
$\psi^3$ Aquarii	5	1.74	11.3	10 18.4	23 22.7	+ 8 17.2	-0.3680	.5555	.2398	+20	-63
B. A. C. 8214	6½	1.65	11.3	8 10.2	23 6 48.6	- 8 32.4	-0.7115	.5499	.2454	+ 2	-90
B. A. C. 8274	6½	1.59	11.3	7 5.3	12 44.2	- 2 48.8	-0.3380	.5456	.2487	+23	-61
30 Piscium	5	+1.52	+11.6	- 6 43.3	18 56.6	+ 3 11.3	+0.8455	.5418	+2514	+84	+ 4
33 Piscium	5	1.51	11.6	6 25.2	20 31.4	+ 4 42.8	+0.9380	.5408	.2519	+84	+ 9
B. A. C. 17	6½	1.48	11.6	5 57.4	22 51.2	+ 6 58.2	+1.0563	.5393	.2525	+84	+17
B. A. C. 81	6½	1.41	11.0	2 55.5	24 5 33.2	-10 32.0	-0.3328	.5356	.2537	+24	-61
14 Ceti	6½	1.34	10.5	1 12.4	10 49.3	- 5 27.0	-0.7534	.5328	.2539	+ 1	-90
15 Ceti	6½	+1.33	+10.6	- 1 12.3	12 3.1	- 4 15.6	-0.4437	.5325	+2539	+18	-68
26 Ceti, <i>mult.</i>	6½	1.20	10.2	+ 0 41.0	25 0 31.7	+ 7 49.4	+0.7725	.5275	.2517	+90	- 1
29 Ceti	6½	1.18	10.1	1 19.5	2 34.2	+ 9 48.1	+0.6219	.5267	.2510	+82	- 9
33 Ceti	6	1.16	10.0	1 46.0	3 50.2	+11 1.7	+0.4833	.5265	.2506	+71	-16
35 Ceti	6½	1.15	10.0	1 47.8	4 48.6	+11 58.2	+0.6952	.5263	.2502	+90	- 5
$f$ Piscium	6	+1.13	+ 9.6	+ 2 56.5	7 23.7	- 9 31.4	+0.1536	.5253	+2491	+50	-33
B. A. C. 408	6½	1.10	9.3	4 4.2	9 48.8	- 7 10.8	-0.4181	.5251	.2481	+20	-66
$\mu$ Piscium	4½	1.06	8.8	5 29.1	13 28.2	- 3 38.3	-0.9883	.5240	.2462	-12	-85
$\nu$ Piscium	4½	1.01	9.1	4 50.5	19 4.6	+ 1 47.7	+1.0558	.5230	.2431	+90	+18
64 Ceti	6½	0.85	8.0	7 58.3	26 9 56.8	- 7 47.4	+1.3107	.5220	.2318	+90	+43
$\xi^1$ Ceti	4½	+0.85	+ 8.0	+ 8 14.8	10 45.4	- 7 0.3	+1.2073	.5220	+2311	+90	+32
B. A. C. 728	6½	0.80	7.3	10 15.3	15 19.7	- 2 34.4	-0.1314	.5222	.2271	+50	-32
$\xi$ Arietis	5½	0.78	7.4	10 1.9	16 37.0	- 1 19.5	+0.6598	.5223	.2255	+88	- 4
B. A. C. 755	6	0.77	7.3	9 59.4	17 35.1	- 0 23.2	+0.9217	.5223	.2245	+90	+11
31 Arietis	5½	0.74	6.7	11 53.6	22 26.9	+ 4 19.7	-0.0191	.5228	.2194	+41	-39
38 Arietis	5	+0.70	+ 5.8	+11 54.5	27 2 35.8	+ 8 21.0	+0.8682	.5232	+2150	+90	+ 9
$\alpha$ Arietis	6	0.66	5.9	14 33.3	5 47.8	+11 27.1	-1.2767	.5236	.2113	-39	-76
B. A. C. 1096	6½	0.46	4.8	17 24.7	28 2 42.3	+ 7 42.6	-0.2163	.5278	.1836	+30	-45
B. A. C. 1242	6	0.34	4.0	19 50.5	15 43.7	- 3 40.8	-0.5909	.5315	.1631	+ 9	-65
$\omega^1$ Tauri	6	0.33	4.2	19 16.2	19 36.3	+ 0 4.5	+0.6507	.5328	.1566	+89	+ 4
$\omega^2$ Tauri	5½	+0.27	+ 3.9	+20 15.8	23 27.9	+ 3 48.7	+0.1618	.5339	+1499	+51	-21
53 Tauri	6½	0.27	3.7	20 49.9	29 0 29.0	+ 4 47.8	-0.3075	.5342	.1481	+25	-46
56 Tauri	6½	0.28	3.4	21 27.8	0 33.2	+ 4 51.9	-0.9863	.5342	.1480	-16	-69
$\kappa^1$ Tauri	5½	0.26	3.1	21 59.9	3 16.6	+ 7 30.1	-1.1757	.5349	.1435	-33	-68
$\kappa^2$ Tauri	6½	0.26	3.3	21 54.4	3 18.1	+ 7 31.5	-1.0705	.5349	.1434	-23	-68
B. A. C. 1373	6	+0.25	+ 3.5	+21 20.1	4 33.2	+ 8 44.2	-0.2685	.5355	+1409	+27	-43
$\tau$ Tauri	4½	0.17	3.0	22 42.6	11 15.7	- 8 46.4	-0.8698	.5374	.1287	- 8	-67
99 Tauri	6½	0.12	2.8	23 44.8	18 33.0	- 1 43.4	-1.1236	.5396	.1143	-29	-66
103 Tauri	6	+0.08	2.7	24 5.7	23 21.4	+ 2 55.5	-0.9795	.5409	.1052	-17	-66
118 Tauri	6	0.00	+ 2.5	+25 2.7	30 9 9.7	-11 35.7	-1.0982	.5434	+0848	-28	-65
121 Tauri	6	-0.02	2.9	23 57.2	12 3.0	- 8 48.1	+0.3413	.5440	.0787	+63	- 4
B. A. C. 1774	6½	0.02	3.0	23 14.9	13 49.3	- 7 5.4	+1.2552	.5444	.0748	+90	+58
132 Tauri	5½	0.06	2.7	24 31.3	18 17.1	- 2 46.6	+0.1608	.5451	.0654	+51	-12
139 Tauri	5½	-0.09	+ 2.5	+25 56.2	22 22.5	+ 1 10.7	-1.1540	.5460	+0558	-34	-64
5 Geminorum	6	0.12	2.9	24 26.8	31 4 37.8	+ 7 13.4	+0.8026	.5470	.0422	+90	+25
B. A. C. 2154	6½	0.18	2.9	24 41.7	16 29.2	- 5 19.2	+0.8744	.5478	.0156	+90	+32
$\epsilon$ Geminorum	3½	-0.19	+ 2.9	+25 15.4	19 25.9	- 2 28.5	+0.2882	.5478	+0089	+60	0

ELEMENTS FOR FACILITATING THE PREDICTION OF OCCULTATIONS OF  
PLANETS AND STARS BY THE MOON.

AUGUST.

STAR'S—				AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1872.0. $\Delta\alpha$ $\Delta\delta$	Apparent Declination.	Washington Mean Time.	Hour Angle. $H$	$Y$	$x'$	$y'$	N'n.	S'n.
37 Geminor.	6	-0.21	+2.9	+25 32.0	1 0 38.0	+ 2 33.1	-0.0031	.5479	-.0028	+41 -15
39 Geminor.	6 $\frac{1}{2}$	0.24	2.9	26 14.9	2 13.0	+ 4 4.9	-0.8030	.5478	.0063	- 6 -64
40 Geminor.	6 $\frac{1}{2}$	0.24	2.9	26 5.2	2 31.1	+ 4 22.4	-0.6255	.5477	.0071	+ 6 -54
$\omega$ Geminorum	6	0.24	3.1	24 23.8	3 54.9	+ 5 43.4	+1.2394	.5476	.0100	+90 +61
48 Geminor.	6	0.25	3.2	24 20.5	8 31.0	+10 10.1	+1.2314	.5474	.0206	+90 +59
52 Geminor.	6	0.25	3.0	25 6.3	9 31.7	+11 8.8	+0.3613	.5471	.0228	+65 + 2
A Geminorum	5 $\frac{1}{2}$	-0.27	+3.1	+25 17.7	13 34.2	- 8 56.8	+0.0400	.5469	-.0318	+44 -16
B. A. C. 2514	6 $\frac{1}{2}$	0.23	3.2	24 30.6	20 50.2	- 1 55.5	+0.6239	.5456	.0478	+90 +14
c Geminorum	6	0.29	3.1	26 5.3	23 4.5	+ 0 14.4	-1.2428	.5453	.0525	-48 -64
$\kappa$ Gemi., mult.	3 $\frac{1}{2}$	0.28	3.3	24 42.2	23 15.9	+ 0 25.4	+0.2662	.5453	.0528	+59 - 5
B. A. C. 3579	6	0.20	3.3	14 59.8	5 7 32.2	+ 6 9.7	+0.6146	.5164	.1937	+84 - 3
i Leonis	6	0.19	3.3	14 47.6	9 17.3	+ 7 51.7	+0.4988	.5159	.1956	+73 -10
k Leonis	6	-0.17	+3.3	+14 52.2	16 41.6	- 8 57.0	-1.0668	.5133	-.2041	-20 -75
l Leonis, mult.	4	0.06	2.4	11 14.1	6 12 30.3	+10 17.3	-1.2966	.5079	.2225	-40 -79
$\nu$ Virginis	6 $\frac{1}{2}$	0.02	1.9	8 50.5	20 17.6	- 6 8.8	-0.4281	.5064	.2279	+19 -65
$\omega$ Virginis	4 $\frac{1}{2}$	-0.01	1.5	7 14.8	7 0 15.8	- 2 17.3	+0.4072	.5059	.2305	+66 -19
B. A. C. 4104	6 $\frac{1}{2}$	+0.08	0.7	4 46.0	14 7.9	+11 11.3	-0.1372	.5047	.2375	+34 -49
c Virginis	5	0.13	+0.4	4 1.5	18 49.2	- 8 15.5	-0.4485	.5047	.2392	+18 -69
B. A. C. 4254	6	+0.19	0.0	+ 2 33.5	8 4 28.3	+ 1 7.2	-1.1773	.5054	-.2418	-26 -88
65 Virginis	6	0.37	-2.3	- 4 15.3	9 4 14.6	+ 0 12.5	+0.3994	.5104	.2418	+65 -21
66 Virginis	6	0.38	2.4	4 29.7	4 52.5	+ 0 49.4	+0.5037	.5107	.2417	+72 -15
l' Virginis	5	0.42	2.8	5 35.7	8 44.6	+ 4 34.7	+0.7461	.5121	.2407	+82 - 2
80 Virginis	6	0.44	2.5	4 44.6	10 35.2	+ 6 22.0	-0.6066	.5130	.2402	+ 9 -81
B. A. C. 4647	6	0.52	3.5	7 25.7	20 33.2	- 7 57.7	-0.1217	.5175	.2364	+34 -49
94 Virginis	6	+0.59	-4.0	- 8 16.9	10 2 15.0	- 2 26.2	-0.5542	.5205	-.2335	+11 -77
95 Virginis	6	0.59	4.1	8 42.2	2 27.8	- 2 13.8	-0.1572	.5207	.2333	+31 -51
96 Virginis	6 $\frac{1}{2}$	0.60	4.4	9 43.7	3 35.5	- 1 8.2	+0.6653	.5213	.2326	+80 - 7
$\kappa$ Virginis	4 $\frac{1}{2}$	0.62	4.4	9 40.7	5 31.9	+ 0 44.7	+0.1621	.5224	.2314	+48 -33
2 Libræ	6	0.66	4.9	11 7.8	10 43.6	+ 5 46.7	+0.5005	.5258	.2279	+68 -15
$\mu$ Libræ	5	0.84	5.7	13 36.9	23 13.4	- 6 7.2	+0.3276	.5341	.2170	+55 -24
$\nu^1$ Libræ	5	+0.94	-6.3	-15 45.6	11 7 19.5	+ 1 43.0	+0.8431	.5404	-.2083	+74 + 5
$\nu^2$ Libræ	6 $\frac{1}{2}$	0.95	6.3	15 59.3	7 24.7	+ 1 48.1	+1.0629	.5409	.2079	+74 +20
$\sigma^1$ Libræ	6	1.03	6.0	15 5.2	13 57.3	+ 8 7.5	-1.2098	.5461	.1998	-38 -90
$\zeta^1$ Libræ	4	1.09	6.1	16 16.2	17 12.7	+11 16.3	-0.6233	.5488	.1953	+ 2 -85
$\zeta^2$ Libræ	7	1.09	6.4	16 59.9	17 48.0	+11 50.4	+0.0173	.5488	.1949	+35 -41
B. A. C. 5099	7	1.09	6.5	16 48.8	18 4.3	-11 53.9	-0.2273	.5495	.1940	+22 -55
$\zeta^3$ Libræ	6	+1.11	-6.1	-16 10.2	18 18.0	-11 40.7	-0.9376	.5497	-.1937	-17 -90
$\zeta^4$ Libræ	6	1.12	6.1	16 25.1	19 18.3	-10 42.3	-0.8742	.5508	.1924	-13 -90
41 Libræ	6	1.17	7.0	18 52.8	21 55.2	- 8 10.9	+1.1738	.5530	.1882	+71 +30
$\kappa$ Libræ	5	1.18	7.1	19 15.8	23 15.9	- 6 53.0	+1.3180	.5544	.1862	+71 +51
$\lambda$ Libræ	6	1.26	7.1	19 47.0	12 4 14.6	- 2 4.8	+0.9438	.5587	.1782	+70 +12
$\beta^1$ Scorpii	2	1.33	6.8	19 27.3	9 28.0	+ 2 57.4	-0.3015	.5640	.1686	+15 -61
$\beta^2$ Scorpii	5 $\frac{1}{2}$	+1.33	-6.8	-19 27.1	9 28.2	+ 2 57.6	-0.3058	.5640	-.1686	+15 -61
$\omega^1$ Scorpii	4 $\frac{1}{2}$	1.35	7.0	20 19.3	10 2.1	+ 3 30.3	+0.4927	.5642	.1678	+58 -15
$\omega^2$ Scorpii	4 $\frac{1}{2}$	1.35	7.0	20 31.4	10 16.9	+ 3 44.5	+0.6572	.5644	.1675	+68 - 6
$\nu^1$ Scorpii	7	1.37	6.5	19 7.1	12 15.5	+ 5 38.7	-1.1097	.5661	.1636	-34 -90
$\nu^2$ Scorpii	4	1.37	6.5	19 7.7	12 15.9	+ 5 39.1	-1.1008	.5661	.1636	-33 -90
B. A. C. 5395	6	1.40	7.1	21 4.4	12 56.5	+ 6 18.3	+0.7818	.5671	.1623	+69 + 2
$\psi$ Ophiuchi	5	+1.45	-6.3	-19 44.3	17 20.4	+10 32.5	-1.2782	.5709	-.1538	-53 -90
$\omega$ Ophiuchi	5	1.51	6.6	21 11.5	20 38.2	-10 17.2	-0.2877	.5744	.1465	+13 -59
22 Ophiuchi	6 $\frac{1}{2}$	1.69	6.5	23 18.1	13 5 49.4	- 1 27.0	+0.6926	.5871	.1259	+61 - 8
24 Ophiuchi	6 $\frac{1}{2}$	1.69	6.5	22 56.8	6 36.8	- 0 41.5	+0.1442	.5876	.1239	+33 -34
39 Oph., mult.	6	1.83	5.9	24 8.8	14 58.1	+ 7 23.1	+0.4063	.5936	.1033	+46 -19
B. A. C. 5831	6	+1.83	-5.9	-23 55.9	15 0.3	+ 7 22.2	+1.1850	.5936	-.1033	+34 -31

## ELEMENTS FOR FACILITATING THE PREDICTION OF OCCULTATIONS OF PLANETS AND STARS BY THE MOON.

AUGUST.

STAR'S—				AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1872.0. $\Delta\alpha$ $\Delta\delta$	Apparent Declination.	Washington Mean Time.	Hour Angle. $H$	$Y$	$x'$	$y'$	N'n.	S'n.
$\theta$ Ophiuchi	3 $\frac{1}{2}$	+1.86 - 5.9	-24° 52.2	13 16 30.4	+ 8 48.6	+0.9802	.5921	-.0989	+65	+17
$\delta$ Ophiuchi	5	1.87 5.5	24 3.4	18 13.0	+10 27.1	-0.0066	.5929	-.0950	+22	-42
$\epsilon$ Ophiuchi	5	1.91 5.4	23 51.8	20 10.3	-11 40.2	-0.3817	.5946	-.0896	+ 2	-66
63 Ophiuchi	6 $\frac{1}{2}$	2.05 4.5	24 51.7	14 5 6.3	- 3 6.2	-0.0666	.6012	-.0646	+17	-46
4 Sagittarii	5	2.06 4.0	23 48.2	6 58 3	- 1 18.8	-1.2399	.6023	-.0590	-58	-90
7 Sagittarii	6	2.09 4.0	24 16.8	8 6.5	- 0 13.4	-0.8270	.6030	-.0558	-25	-90
9 Sagittarii	4 $\frac{1}{2}$	+2.09 - 3.9	-24 21.7	8 29.5	+ 0 8.5	-0.7667	.6034	-.0541	-22	-90
B. A. C. 6217	6 $\frac{1}{2}$	2.18 3.2	24 58.5	15 3.9	+ 6 26.4	-0.4468	.6069	-.0352	- 6	-72
$\lambda$ Sagittarii	3	2.23 3.0	25 29.5	17 26.3	+ 8 42.8	-0.0055	.6081	-.0271	+17	-42
B. A. C. 6369	6	2.30 2.0	25 8.5	23 39.1	- 9 20.3	-0.4628	.6015	-.0079	- 9	-73
$\sigma$ Sagittarii	2 $\frac{1}{2}$	2.37 1.9	26 27.2	15 3 26.7	- 5 42.5	+0.8304	.6118	+.0042	+64	+ 7
B. A. C. 6490	6 $\frac{1}{2}$	2.37 0.9	25 1.4	6 6.5	- 3 9.6	-0.5645	.6123	-.0122	-14	-82
B. A. C. 6562	6 $\frac{1}{2}$	+2.42 - 0.7	-26 7.2	10 0.6	+ 0 34.5	+0.5931	.6131	+.0219	+53	- 8
$\psi$ Sagittarii	5	2.43 0.2	25 28.5	10 51.9	+ 1 23.6	-0.0227	.6131	-.0275	+16	-43
B. A. C. 6576	6	2.41 - 0.1	24 23.7	10 53.2	+ 1 24.8	-1.0889	.6131	-.0275	-45	-90
$\chi^1$ Sagittarii	6	2.44 + 0.5	24 45.3	14 25.6	+ 4 48.1	-0.6155	.6133	-.0392	-15	-88
$\chi^2$ Sagittarii	6 $\frac{1}{2}$	2.44 + 0.6	24 39.7	14 28.1	+ 4 50.5	-0.7058	.6133	-.0393	-20	-90
$\chi^3$ Sagittarii	6	2.43 0.7	24 12.6	14 31.3	+ 4 53.5	-1.1492	.6135	-.0394	-50	-90
$\Lambda^1$ Sagittarii	6	+2.50 + 1.0	-24 59.8	18 20.5	+ 8 32.8	-0.1999	.6135	+.0506	+ 8	-54
$\Lambda^2$ Sagittarii	4 $\frac{1}{2}$	2.50 1.1	25 9.8	18 35.0	+ 8 46.7	-0.0233	.6135	-.0522	+18	-43
B. A. C. 7049	6	2.56 5.0	22 48.8	16 14 0.7	+ 3 22.4	-0.7405	.6087	-.1111	+15	-90
17 Capricorni	6	2.61 5.9	21 58.6	20 13.6	+ 9 19.7	-0.8145	.6060	-.1286	-18	-90
B. A. C. 7197	6	2.62 6.1	23 12.0	21 1.7	+10 5.8	+0.4909	.6355	-.1309	+54	-14
$\chi$ Capricorni	6	2.63 7.4	21 42.3	17 4 41.0	- 6 34.0	+0.1056	.6009	-.1515	+34	-36
27 Capricorni	6	+2.61 + 7.8	-21 4.0	5 3.9	- 6 12.0	-0.4621	.6009	+.1522	+ 4	-72
$\phi$ Capricorni	6	2.61 8.1	21 10.7	7 23.5	- 3 58.1	-0.0099	.5994	-.1586	+29	-41
33 Capricorni	6	2.61 8.5	21 23.5	10 40.0	- 0 49.6	+0.7497	.5970	-.1663	+67	0
35 Capricorni	6	2.61 8.8	21 44.7	11 51.4	+ 0 18.9	+1.2963	.5964	-.1694	+68	+50
37 Capricorni	6	2.60 9.2	20 39.1	14 49.4	+ 3 9.7	+0.7345	.5944	-.1759	+69	- 1
$\epsilon$ Capricorni	4 $\frac{1}{2}$	2.59 9.5	20 2.1	15 41.8	+ 3 59.9	+0.2851	.5936	-.1779	+46	-26
$\kappa$ Capricorni	5	+2.57 + 9.8	-19 26.7	17 52.8	+ 6 5.7	+0.0998	.5921	+.1827	+37	-36
B. A. C. 7550	6	2.59 9.7	20 12.2	18 5.6	+ 6 18.0	+0.8821	.5921	-.1831	+70	+ 8
20 Aquar., <i>mult.</i>	6	2.54 11.1	17 34.6	18 1 45.0	-10 20.8	-0.2323	.5860	-.1988	+21	-55
56 Aquarii	6	2.47 12.4	15 14.1	13 5.4	+ 0 33.5	-0.1652	.5773	-.2186	+27	-51
$\tau^1$ Aquar., <i>mult.</i>	6	2.43 13.1	14 43.6	20 21.2	+ 7 33.0	+0.9623	.5719	-.2291	+76	+12
$\tau^2$ Aquarii	4	2.42 13.4	14 15.8	21 9.0	+ 8 19.1	+0.6877	.5711	-.2306	+76	- 5
74 Aquarii	6	+2.39 +13.2	-12 17.6	22 48.2	+ 9 54.7	-0.8754	.5682	+.2324	-10	-90
$\psi^1$ Aquarii	4 $\frac{1}{2}$	2.31 14.0	9 46.9	19 8 24.1	- 4 50.3	-1.0827	.5623	-.2432	-22	-90
$\psi^2$ Aquarii	4 $\frac{1}{2}$	2.30 14.0	9 52.7	9 17.8	- 3 58.5	-0.7686	.5620	-.2440	- 2	-90
$\psi^3$ Aquarii	5	2.31 14.1	10 18.4	9 45.2	- 3 32.1	-0.2323	.5614	-.2443	+27	-55
B. A. C. 8214	6 $\frac{1}{2}$	2.25 14.4	8 10.1	17 2.5	+ 3 29.7	-0.5549	.5563	-.2503	+11	-77
B. A. C. 8274	6 $\frac{1}{2}$	2.22 14.6	7 5.2	22 50.5	+ 9 5.7	-0.1718	.5525	-.2539	+31	-51
30 Piscium	5	+2.17 +15.0	- 6 43.3	20 4 54.4	- 9 2.8	+1.0118	.5488	+.2566	+84	+14
33 Piscium	5	2.15 15.0	6 25.2	6 26.9	- 7 33.5	+1.1064	.5478	+.2572	+84	+21
B. A. C. 17	6 $\frac{1}{2}$	2.14 15.0	5 57.3	8 43.3	- 5 21.7	+1.2280	.5466	+.2579	+84	+31
B. A. C. 81	6 $\frac{1}{2}$	2.07 14.6	2 55.4	15 15.2	+ 0 57.0	-0.1321	.5435	-.2591	+35	+49
14 Ceti	6 $\frac{1}{2}$	2.03 14.4	1 12.3	20 23.0	+ 5 54.8	-0.5376	.5408	-.2593	+14	-75
15 Ceti	6 $\frac{1}{2}$	2.02 14.5	- 1 12.2	21 34.7	+ 7 4.0	-0.2296	.5403	-.2592	+29	-55
26 Ceti, <i>mult.</i>	6 $\frac{1}{2}$	+1.93 +14.5	+ 0 41.0	21 9 42.7	- 5 11.7	+0.9906	.5356	+.2569	+90	+13
29 Ceti	6 $\frac{1}{2}$	1.91 14.4	1 19.6	11 41.7	- 3 16.5	+0.8449	.5348	+.2562	+90	+ 3
33 Ceti	6	1.90 14.2	1 46.1	12 55.6	- 2 4.9	+0.7099	.5347	+.2558	+90	- 4
35 Ceti	6 $\frac{1}{2}$	1.90 14.2	1 47.9	13 52.2	- 1 10.2	+0.9204	.5343	+.2555	+99	+ 8
$f$ Piscium	6	1.87 14.0	2 56.6	16 22.9	+ 1 15.7	+0.3895	.5336	+.2542	+65	-21
B. A. C. 408	6 $\frac{1}{2}$	+1.84 +1.37	+ 4 4.3	18 43.8	+ 3 32.1	-0.1714	.5330	+.2531	+33	-51

ELEMENTS FOR FACILITATING THE PREDICTION OF OCCULTATIONS OF  
PLANETS AND STARS BY THE MOON.

## AUGUST.

STAR'S—				AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1872.0. $\Delta\alpha$ $\Delta\delta$	Apparent Declination.	Washington Mean Time.	Hour Angle. $H$	$Y$	$z'$	$y'$	N'n.	S'n.
$\mu$ Piscium	4 $\frac{1}{2}$	+1.82	+13.3	+ 5 29.2	21 22 17.0	+ 6 58.5	-0.7300	.5324	+2513	+ 3 -84
$\nu$ Piscium	4 $\frac{1}{2}$	1.77	13.5	4 50.6	22 3 43.7	-11 45.2	+1.2933	.5311	.2477	+90 +39
B. A. C. 728	6 $\frac{1}{2}$	1.61	11.8	10 15.4	23 24.9	+ 7 18.5	+0.3969	.5295	.2304	+65 -18
$\xi$ Arietis	5 $\frac{1}{2}$	1.60	12.1	10 2.0	23 0 40.1	+ 8 31.3	+0.9194	.5295	.2291	+90 +11
B. A. C. 755	6	1.59	11.8	9 59.5	1 36.6	+ 9 26.1	+1.1787	.5295	.2281	+90 +30
31 Arietis	5 $\frac{1}{2}$	1.56	11.1	11 53.7	6 20.7	- 9 58.8	+0.2515	.5297	.2231	+56 -25
38 Arietis	5	+1.51	+11.1	+11 54.5	10 23.2	- 6 3.9	+1.1293	.5300	+2179	+90 +27
$\sigma$ Arietis	6	1.50	10.1	14 33.3	13 30.3	- 3 2.9	-0.9895	.5301	.2141	-14 -76
B. A. C. 1096	6 $\frac{1}{2}$	1.33	8.5	17 24.8	24 9 56.1	- 7 16.0	+0.0573	.5330	.1852	+45 -33
13 Tauri	6 $\frac{1}{2}$	1.29	7.7	19 17.4	13 48.1	- 3 31.5	-1.2503	.5336	.1789	-39 -71
B. A. C. 1242	6	1.22	7.2	19 50.5	22 42.5	+ 7 5.6	-0.3186	.5354	.1638	+24 -48
$\omega^1$ Tauri	6	1.18	7.3	19 16.2	25 2 31.1	+ 8 46.9	+0.9102	.5364	.1571	+90 +19
$\omega^2$ Tauri	5 $\frac{1}{2}$	+1.14	+ 6.8	+20 15.8	6 18.9	-11 32.8	+0.4230	.5373	+1507	+69 - 8
53 Tauri	6 $\frac{1}{2}$	1.14	6.5	20 50.0	7 19.1	-10 34.6	-0.0429	.5373	.1487	+39 -32
56 Tauri	6 $\frac{1}{2}$	1.14	6.4	21 79.9	7 23.2	-10 30.6	-0.7160	.5373	.1481	+ 2 -69
$\kappa^1$ Tauri	5 $\frac{1}{2}$	1.12	6.1	22 0.0	10 4.2	- 7 54.9	-0.9059	.5380	.1436	-10 -68
$\kappa^2$ Tauri	6 $\frac{1}{2}$	1.12	6.1	21 54.4	10 5.6	- 7 53.5	-0.8017	.5380	.1435	- 4 -63
B. A. C. 1373	6	1.10	6.2	21 20.1	11 19.5	- 6 42.0	-0.0069	.5381	.1414	+41 -23
$\tau$ Tauri	4 $\frac{1}{2}$	+1.05	+ 5.5	+22 42.6	17 56.5	- 0 18.1	-0.6093	.5399	+1284	+ 8 -62
90 Tauri	6 $\frac{1}{2}$	1.00	4.9	23 44.9	26 1 8.6	+ 6 39.7	-0.8686	.5414	.1142	- 9 -66
103 Tauri	6	0.94	4.6	24 5.7	5 53.8	+11 15.5	-0.7301	.5422	.1042	0 -66
118 Tauri	6	0.85	3.8	25 2.7	15 36.9	- 3 20.9	-0.8596	.5441	.0836	- 8 -65
121 Tauri	6	0.82	4.1	23 57.2	18 28.8	- 0 34.8	+0.5695	.5445	.0773	+82 + 8
132 Tauri	5 $\frac{1}{2}$	0.76	3.8	24 31.5	27 0 40.4	+ 5 24.2	+0.3829	.5454	.0639	+67 - 1
139 Tauri	5 $\frac{1}{2}$	+0.73	+3.2	+25 56.2	4 44.4	+ 9 20.0	-0.9317	.5460	+0.549	-14 -64
5 Geminorum	6	0.66	3.4	24 26.8	10 57.8	- 8 39.2	+1.0093	.5465	0.411	+90 +38
B. A. C. 2154	6 $\frac{1}{2}$	0.56	2.8	24 41.7	22 46.9	+ 2 46.0	+1.0644	.5468	0.142	+90 +44
$\epsilon$ Geminorum	3 $\frac{1}{2}$	0.53	2.6	25 15.4	28 1 43.1	+ 5 36.2	+0.4762	.5468	+0.075	+74 +10
37 Geminor.	6	0.50	2.4	25 32.0	6 54.7	+10 37.4	+0.1778	.5466	-0.041	+53 - 5
39 Geminor.	6 $\frac{1}{2}$	0.48	2.1	26 14.9	8 29.5	-11 51.1	-0.6226	.5465	.0080	+ 6 -55
40 Geminor.	6 $\frac{1}{2}$	+0.48	+2.0	+26 5.2	8 47.6	-11 33.6	-0.4461	.5465	-0.0086	+16 -41
52 Geminor.	6	0.41	2.3	25 6.3	15 47.8	- 4 47.6	+0.5273	.5456	.0243	+79 +11
A Geminorum	5 $\frac{1}{2}$	0.39	2.1	25 17.7	19 50.1	- 0 53.4	+0.2001	.5453	.0333	+54 - 7
B. A. C. 2514	6 $\frac{1}{2}$	0.33	2.3	24 30.6	29 3 6.0	+ 6 7.8	+0.7707	.5443	.0489	+90 +22
$\kappa$ Geminorum	6	0.32	1.7	26 5.2	5 20.3	+ 8 17.7	-1.0667	.5438	.0540	-23 -64
$\epsilon$ Gemi., <i>mult.</i>	3 $\frac{1}{2}$	0.31	2.2	24 42.2	5 31.7	+ 8 28.7	+0.4295	.5436	.0550	+70 + 3
$\omega^1$ Cancri	6	+0.26	+1.7	+25 44.5	13 10.0	- 8 8.2	-1.2056	.5420	-0.0711	-40 -64
$\omega^2$ Cancri	6 $\frac{1}{2}$	0.26	1.8	25 26.4	13 33.0	- 7 45.9	-0.8976	.5419	.0722	-12 -65
$\lambda$ Cancri	6	0.20	1.7	24 25.4	22 23.9	+ 0 47.5	-0.4898	.5394	.0908	+14 -52
$\nu^1$ Cancri	6 $\frac{1}{2}$	0.17	1.7	24 34.1	30 2 12.8	+ 4 28.9	-1.0102	.5385	.0981	-20 -66
$\nu^2$ Cancri	6	0.16	1.6	24 30.7	3 35.5	+ 5 48.9	-1.0842	.5379	.1012	-26 -66
32 Cancri	6	+0.16	+1.6	+24 31.1	4 18.0	+ 6 30.1	-1.1647	.5377	-1.023	-34 -66
$\gamma$ Cancri	4 $\frac{1}{2}$	0.14	2.0	21 55.7	9 15.6	+11 18.0	+1.1787	.5363	.1121	+90 +45
$\xi$ Cancri	5	0.08	1.8	22 33.7	21 48.6	- 0 33.0	-1.0827	.5319	.1357	-24 -63
79 Cancri	6	0.08	1.8	22 30.9	22 17.6	- 0 4.9	-1.0960	.5316	.1364	-23 -63
B. A. C. 3138	6	+0.07	+1.9	+21 48.6	23 54.2	+ 1 28.6	-0.5514	.5311	-1.1304	+12 -63
SEPTEMBER.										
B. A. C. 4104	6 $\frac{1}{2}$	-0.01	+0.6	+ 4 46.0	3 19 57.0	- 5 12.2	-0.2015	.5070	-2408	+27 -53
$\epsilon$ Virginis	5	0.00	0.4	4 1.5	4 0 36.6	- 0 40.7	-0.6126	.5070	.2425	+10 -31
B. A. C. 4254	6	+0.03	+0.2	+ 2 33.5	10 12.1	+ 8 38.5	-1.3605	.5076	.2448	-46 -88
48 Virginis	6	0.08	-1.0	- 2 58.5	23 42.0	- 2 14.9	+1.2915	.5096	.2456	+87 +37
65 Virginis	6	0.14	1.5	4 15.3	5 9 52.0	+ 7 37.4	+0.1724	.5120	.2442	+51 -33
66 Virginis	6	+0.14	-1.5	- 4 29.7	10 29.8	+ 8 14.1	+0.2757	.5123	-2440	+57 -28

## ELEMENTS FOR FACILITATING THE PREDICTION OF OCCULTATIONS OF PLANETS AND STARS BY THE MOON.

SEPTEMBER.

STAR'S—				AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'us from 1872.0. $\Delta\alpha$ $\Delta\delta$	Apparent Declination.	Washington Mean Time.	Hour Angle. $H$	$Y$	$x'$	$y'$	N'n.	S'n.
$\iota^1$ Virginis	5	+0.14	-1.7	- 5 35.7	$\begin{smallmatrix} d & h & m \\ 5 & 14 & 21.4 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ +11 & 58.9 \end{smallmatrix}$	+0.5126	.5133	-.2430	+72   -15
$\iota^2$ Virginis	6	0.16	1.7	4 44.6	$\begin{smallmatrix} h & m \\ 16 & 11.8 \end{smallmatrix}$	-10 14.0	-0.8439	.5140	.2424	- 4   -90
B. A. C. 4647	6	0.22	2.2	7 25.7	$\begin{smallmatrix} h & m \\ 6 & 2 & 9.4 \end{smallmatrix}$	- 0 34.2	-0.3714	.5180	.2381	+21   -64
94 Virginis	6	0.27	2.8	8 16.9	$\begin{smallmatrix} h & m \\ 7 & 51.7 \end{smallmatrix}$	+ 4 57.8	-0.8119	.5206	.2348	- 4   -90
95 Virginis	6	0.28	3.0	8 42.2	$\begin{smallmatrix} h & m \\ 8 & 4.5 \end{smallmatrix}$	+ 5 10.2	-0.4143	.5206	.2347	+18   -67
96 Virginis	6 $\frac{1}{2}$	0.28	3.2	9 43.7	$\begin{smallmatrix} h & m \\ 9 & 12.4 \end{smallmatrix}$	+ 6 16.1	+0.4096	.5212	.2340	+63   -20
$\kappa$ Virginis	4 $\frac{1}{2}$	+0.30	-3.3	- 9 40.7	$\begin{smallmatrix} h & m \\ 11 & 9.0 \end{smallmatrix}$	+ 8 9.1	-0.0970	.5222	-.2327	+33   -47
2 Libræ	6	0.34	3.6	11 7.7	$\begin{smallmatrix} h & m \\ 16 & 21.8 \end{smallmatrix}$	-10 47.7	+0.2378	.5252	.2285	+52   -29
$\mu$ Libræ	5	0.47	4.5	13 36.9	$\begin{smallmatrix} h & m \\ 7 & 4 & 56.2 \end{smallmatrix}$	+ 1 23.1	+0.0563	.5325	.2172	+40   -39
$\nu^1$ Libræ	6	0.56	5.2	15 45.6	$\begin{smallmatrix} h & m \\ 13 & 6.7 \end{smallmatrix}$	+ 9 17.7	+0.5721	.5379	.2079	+68   -11
$\nu^2$ Libræ	6 $\frac{1}{2}$	0.56	5.2	15 59.3	$\begin{smallmatrix} h & m \\ 13 & 11.9 \end{smallmatrix}$	+ 9 22.7	+0.7934	.5380	.2078	+74   + 1
28 Libræ	6	0.64	5.8	17 41.6	$\begin{smallmatrix} h & m \\ 19 & 42.6 \end{smallmatrix}$	- 8 19.6	+1.2517	.5429	.1991	+73   +38
$\zeta^1$ Libræ	4	+0.69	-5.2	-16 16.2	$\begin{smallmatrix} h & m \\ 23 & 6.9 \end{smallmatrix}$	- 5 2.1	-0.9072	.5454	-.1945	-15   -90
$\zeta^2$ Libræ	7	0.68	5.4	16 59.9	$\begin{smallmatrix} h & m \\ 23 & 42.7 \end{smallmatrix}$	- 4 27.5	-0.2614	.5460	.1935	+20   -57
B. A. C. 5099	7	0.69	5.4	16 49.0	$\begin{smallmatrix} h & m \\ 23 & 59.3 \end{smallmatrix}$	- 4 11.5	-0.5058	.5461	.1932	+ 7   -75
$\zeta^3$ Libræ	6	0.76	5.2	16 10.2	$\begin{smallmatrix} h & m \\ 8 & 0 & 13.1 \end{smallmatrix}$	- 3 58.1	-1.2246	.5461	.1929	-40   -90
$\zeta^4$ Libræ	6	0.72	5.3	16 25.1	$\begin{smallmatrix} h & m \\ .1 & 14.2 \end{smallmatrix}$	- 2 59.1	-1.1609	.5471	.1914	-34   -90
41 Libræ	6	0.74	6.0	18 52.8	$\begin{smallmatrix} h & m \\ 3 & 53.5 \end{smallmatrix}$	- 0 25.2	+0.9057	.5490	.1873	+71   + 9
$\kappa$ Libræ	5	+0.78	-6.1	-19 15.8	$\begin{smallmatrix} h & m \\ 5 & 15.4 \end{smallmatrix}$	+ 0 53.9	+1.0510	.5500	-.1852	+71   +19
$\lambda$ Libræ	6	0.84	6.3	19 47.0	$\begin{smallmatrix} h & m \\ 10 & 18.9 \end{smallmatrix}$	+ 5 46.9	+0.6750	.5539	.1769	+69   - 5
B. A. C. 5281	6	0.86	6.5	20 36.6	$\begin{smallmatrix} h & m \\ 12 & 21.2 \end{smallmatrix}$	+ 7 45.0	+1.1760	.5555	.1734	+70   +31
$\beta^1$ Scorpii	2	0.89	6.0	19 27.3	$\begin{smallmatrix} h & m \\ 15 & 38.0 \end{smallmatrix}$	+10 54.8	-0.5817	.5585	.1671	0   -82
$\beta^2$ Scorpii	5 $\frac{1}{2}$	0.89	6.0	19 27.1	$\begin{smallmatrix} h & m \\ 15 & 38.2 \end{smallmatrix}$	+10 55.0	-0.5863	.5585	.1671	0   -82
$\omega^1$ Scorpii	4 $\frac{1}{2}$	0.91	6.1	20 19.3	$\begin{smallmatrix} h & m \\ 16 & 12.7 \end{smallmatrix}$	+11 28.3	+0.2213	.5586	.1663	+42   -30
$\omega^2$ Scorpii	4	+0.91	-6.3	-20 31.4	$\begin{smallmatrix} h & m \\ 16 & 27.8 \end{smallmatrix}$	+11' 42.8	+0.3874	.5591	-.1655	+51   -21
B. A. C. 5395	6	0.95	6.3	21 4.4	$\begin{smallmatrix} h & m \\ 19 & 10.5 \end{smallmatrix}$	- 9 40.3	+0.5150	.5612	.1607	+59   -14
$\omega$ Ophiuchi	5	1.07	6.1	21 11.5	$\begin{smallmatrix} h & m \\ 9 & 3 & 1.9 \end{smallmatrix}$	- 2 6.0	-0.5627	.5674	.1448	- 1   -81
22 Ophiuchi	6 $\frac{1}{2}$	1.23	6.3	23 18.1	$\begin{smallmatrix} h & m \\ 12 & 26.2 \end{smallmatrix}$	+ 6 57.4	+0.3449	.5749	.1236	+45   -23
24 Ophiuchi	6 $\frac{1}{2}$	1.25	6.3	22 56.8	$\begin{smallmatrix} h & m \\ 13 & 14.8 \end{smallmatrix}$	+ 7 44.1	-0.1193	.5753	.1222	+20   -49
39 Oph., <i>mult.</i>	6	1.40	5.9	24 8.8	$\begin{smallmatrix} h & m \\ 21 & 49.3 \end{smallmatrix}$	- 8 1.1	+0.1534	.5817	.1011	+32   -33
B. A. C. 5831	6	+1.40	-5.8	-23 55.9	$\begin{smallmatrix} h & m \\ 21 & 51.6 \end{smallmatrix}$	- 7 58.9	-0.0708	.5817	-.1010	+20   -46
$\theta$ Ophiuchi	3 $\frac{1}{2}$	1.42	5.8	24 52.2	$\begin{smallmatrix} h & m \\ 23 & 24.2 \end{smallmatrix}$	- 6 30.0	+0.7369	.5830	.0967	+64   0
$\delta$ Ophiuchi	5	1.45	5.7	24 3.4	$\begin{smallmatrix} h & m \\ 10 & 1 & 9.6 \end{smallmatrix}$	- 4 48.7	-0.2620	.5841	.0927	+ 9   -58
$\epsilon^2$ Ophiuchi	5	1.49	5.6	23 51.8	$\begin{smallmatrix} h & m \\ 3 & 10.2 \end{smallmatrix}$	- 2 52.7	-0.6405	.5855	.0875	-11   -90
63 Ophiuchi	6 $\frac{1}{2}$	1.63	5.0	24 51.7	$\begin{smallmatrix} h & m \\ 12 & 22.0 \end{smallmatrix}$	+ 5 57.1	-0.3110	.5914	.0619	+ 4   -61
7 Sagittarii	6	1.67	4.5	24 16.8	$\begin{smallmatrix} h & m \\ 15 & 27.8 \end{smallmatrix}$	+ 8 55.5	-1.0797	.5929	.0535	-43   -90
9 Sagittarii	4 $\frac{1}{2}$	+1.68	-4.5	-24 21.7	$\begin{smallmatrix} h & m \\ 15 & 51.5 \end{smallmatrix}$	+ 9 18.1	-1.0179	.5932	-.0525	-38   -90
B. A. C. 6217	6 $\frac{1}{2}$	1.82	4.0	24 58.5	$\begin{smallmatrix} h & m \\ 22 & 38.3 \end{smallmatrix}$	- 8 11.6	-0.6845	.5962	.0329	-19   -93
$\lambda$ Sagittarii	3	1.86	4.0	25 29.5	$\begin{smallmatrix} h & m \\ 11 & 1 & 5.3 \end{smallmatrix}$	- 5 50.6	-0.2332	.5974	.0259	+ 4   -56
B. A. C. 6369	6	1.95	3.0	25 8.5	$\begin{smallmatrix} h & m \\ 7 & 30.2 \end{smallmatrix}$	+ 0 18.5	-0.6890	.5995	-.0063	-21   -90
$\sigma$ Sagittarii	2 $\frac{1}{2}$	2.04	3.1	26 27.2	$\begin{smallmatrix} h & m \\ 11 & 25.3 \end{smallmatrix}$	+ 4 3.8	+0.6310	.6006	+0.0056	+55   - 6
B. A. C. 6490	6 $\frac{1}{2}$	2.05	2.1	25 1.4	$\begin{smallmatrix} h & m \\ 14 & 10.5 \end{smallmatrix}$	+ 6 42.2	-0.7827	.6009	.0119	-26   -90
B. A. C. 6562	6 $\frac{1}{2}$	+2.12	-1.8	-26 7.2	$\begin{smallmatrix} h & m \\ 18 & 12.3 \end{smallmatrix}$	+10 33.9	+0.4002	.6019	+0.0256	+40   -19
$\psi$ Sagittarii	5	2.13	1.6	25 28.5	$\begin{smallmatrix} h & m \\ 19 & 5.3 \end{smallmatrix}$	+11 24.8	-0.2240	.6019	.0284	+ 5   -56
$\chi^1$ Sagittarii	6	2.17	0.7	24 45.3	$\begin{smallmatrix} h & m \\ 22 & 46.1 \end{smallmatrix}$	- 9 3.6	-0.8202	.6020	.0398	-26   -90
$\chi^2$ Sagittarii	6 $\frac{1}{2}$	2.16	0.6	24 39.7	$\begin{smallmatrix} h & m \\ 22 & 48.7 \end{smallmatrix}$	- 9 1.0	-0.9120	.6020	.0400	-32   -90
$\chi^3$ Sagittarii	6	2.23	0.1	24 59.8	$\begin{smallmatrix} h & m \\ 12 & 2 & 48.8 \end{smallmatrix}$	- 5 11.0	-0.3910	.6023	.0521	- 2   -67
$\kappa^1$ Sagittarii	4 $\frac{1}{2}$	2.24	-0.3	25 9.8	$\begin{smallmatrix} h & m \\ 3 & 3.8 \end{smallmatrix}$	+ 4 56.7	-0.2111	.6023	.0526	+ 8   -55
B. A. C. 7049	6	+2.42	+3.4	-22 48.8	$\begin{smallmatrix} h & m \\ 23 & 6.8 \end{smallmatrix}$	- 9 43.4	-0.9003	.5986	+1112	-25   -90
17 Capricorni	6	2.47	4.6	21 58.6	$\begin{smallmatrix} h & m \\ 13 & 5 & 30.8 \end{smallmatrix}$	- 3 35.2	-0.9616	.5958	.1293	-27   -90
B. A. C. 7197	6	2.50	4.5	23 12.0	$\begin{smallmatrix} h & m \\ 6 & 20.3 \end{smallmatrix}$	- 2 47.6	+0.3633	.5958	.1306	+46   -22
$\chi$ Capricorni	6	2.53	6.2	21 42.3	$\begin{smallmatrix} h & m \\ 14 & 12.6 \end{smallmatrix}$	+ 4 45.6	-0.0099	.5922	.1512	+27   -42
27 Capricorni	6	2.54	6.6	21 4.0	$\begin{smallmatrix} h & m \\ 14 & 36.1 \end{smallmatrix}$	+ 5 8.1	-0.5836	.5918	.1526	- 2   -83
$\phi$ Capricorni	6	+2.55	+6.8	-21 10.8	$\begin{smallmatrix} h & m \\ 16 & 59.4 \end{smallmatrix}$	+ 7 25.7	-0.1004	.5907	+1583	+24   -48



ELEMENTS FOR FACILITATING THE PREDICTION OF OCCULTATIONS OF  
PLANETS AND STARS BY THE MOON.

SEPTEMBER.

STAR'S—					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1872.0.		Apparent Declination.	Washington Mean Time.	Hour Angle. <i>H</i>	<i>Y</i>	<i>z'</i>	<i>y'</i>	N'n.	S'n.
		<i>s</i>	<i>Δδ</i>		<i>d h m</i>	<i>h m</i>				<i>°</i>	<i>'</i>
33 Capricorni	6	+2.59	+ 7.2	-21° 23.5	13 20 21.0	+10 39.4	+0.6563	.5887	+1660	+67	- 6
35 Capricorni	6	2.61	7.4	21 44.8	21 34.2	+11 49.7	+1.2126	.5879	.1693	+68	+36
37 Capricorni	6	2.60	8.1	20 39.1	14 0 36.6	- 9 15.1	+0.6507	.5863	.1761	+68	- 6
<i>e</i> Capricorni	4½	2.59	8.3	20 2.1	1 30.3	- 8 23.5	+0.1985	.5856	.1783	+42	-31
<i>κ</i> Capricorni	5	2.59	8.8	19 26.8	3 44.3	- 6 14.7	+0.0169	.5845	.1830	+32	-41
B. A. C. 7550	6	2.60	8.7	20 12.2	3 57.5	- 6 2.0	+0.8078	.5845	.1834	+70	+ 3
29 Aqu., <i>mult.</i>	6	+2.61	+10.2	-17 34.6	11 46.8	+ 1 29.2	-0.2977	.5794	+1993	+18	-59
56 Aquarii	6	2.61	11.9	15 14.1	23 19.4	-11 24.4	-0.1988	.5725	.2194	+25	-53
<i>γ</i> Aqu., <i>mult.</i>	6	2.61	13.0	14 43.6	15 6 41.4	- 4 18.7	+0.9556	.5675	.2306	+76	+11
<i>γ</i> Aquarii	4	2.02	13.2	14 15.8	7 29.8	- 3 32.0	+0.6815	.5669	.2317	+76	- 6
74 Aquarii	6	2.59	13.5	12 17.6	9 10.2	- 1 55.3	-0.8857	.5662	.2337	-10	-90
<i>ψ</i> Aquarii	4½	2.57	14.6	9 46.8	18 51.5	+ 7 25.2	-1.0637	.5603	.2450	-20	-90
<i>ψ</i> Aquarii	4½	+2.57	+14.7	- 9 52.6	19 45.7	+ 8 17.5	-0.7468	.5598	+2459	0	-90
<i>ψ</i> Aquarii	5	2.57	14.7	10 18.4	20 13.2	+ 8 44.1	-0.2066	.5596	.2463	+28	-53
B. A. C. 8214	6½	2.55	15.4	8 10.1	16 3 32.7	- 8 11.9	-0.5085	.5554	.2527	+14	-73
B. A. C. 8274	6½	2.55	15.8	7 5.2	9 21.6	- 2 35.0	-0.1079	.5527	.2566	+35	-48
30 Piscium	5	2.53	16.3	6 43.2	15 25.3	+ 3 16.3	+1.0227	.5495	.2597	+34	+19
33 Piscium	5	2.53	16.4	6 25.2	16 57.6	+ 4 45.4	+1.1907	.5489	.2603	+34	+27
B. A. C. 17	6	+2.53	+16.5	- 5 57.3	19 13.7	+ 6 56.8	+1.3180	.5479	+2611	+34	+40
B. A. C. 81	6½	2.49	16.7	2 55.4	17 1 43.7	-10 46.3	-0.0219	.5451	.2627	+40	-43
14 Ceti	6½	2.47	16.7	1 12.3	6 49.3	- 5 50.8	-0.4125	.5434	.2631	+20	-66
15 Ceti	6½	2.47	16.7	- 1 12.2	8 0.5	- 4 42.0	-0.1023	.5430	.2631	+36	-48
26 Ceti, <i>mult.</i>	6½	2.44	16.9	+ 0 41.1	20 0.6	+ 6 54.4	+1.1424	.5396	.2613	+90	+23
29 Ceti	6½	2.42	16.9	1 19.6	21 58.1	+ 8 48.0	+1.0023	.5391	.2607	+90	+13
33 Ceti	6	+2.41	+16.9	+ 1 46.1	23 10.9	+ 9 58.5	+0.8706	.5389	+2601	+90	+ 5
35 Ceti	6½	2.41	17.0	1 48.0	18 0 6.8	+10 52.5	+1.0822	.5389	.2599	+90	+19
<i>f</i> Piscium	6	2.40	16.7	2 56.7	2 35.3	-10 43.9	+0.5600	.5384	.2587	+77	-13
B. A. C. 408	6	2.38	16.7	4 4.4	4 54.0	- 8 29.6	+0.0079	.5379	.2577	+42	-41
<i>μ</i> Piscium	4½	2.37	16.5	5 29.2	8 23.7	- 5 6.8	-0.5386	.5372	.2556	+14	-74
B. A. C. 481	6½	2.37	16.1	6 59.7	11 10.5	- 2 25.3	-1.3721	.5370	.2541	-49	-83
B. A. C. 728	6½	+2.28	+15.2	+10 15.4	19 9 1.7	- 5 16.5	+0.6261	.5360	+2351	+84	- 6
<i>ξ</i> Arietis	5½	2.27	15.1	10 2.0	10 15.3	- 4 5.4	+1.1455	.5362	.2338	+90	+27
31 Arietis	5½	2.24	14.4	11 53.7	15 48.1	+ 1 16.6	+0.4924	.5364	.2272	+73	-13
38 Arietis	5	2.23	14.3	11 54.6	19 44.9	+ 5 5.8	+1.3671	.5367	.2223	+90	+57
<i>σ</i> Arietis	6	2.23	13.5	14 33.4	22 47.7	+ 8 2.6	-0.7266	.5372	.2184	+ 3	-75
B. A. C. 1096	6½	2.12	11.6	17 24.8	20 18 43.9	+ 3 19.7	+0.3295	.5399	.1883	+62	-17
13 Tauri	6½	+2.11	+10.8	+19 17.5	22 30.4	+ 6 58.7	-0.9623	.5405	+1818	-13	-71
B. A. C. 1242	6	2.06	9.9	19 50.6	21 7 12.2	- 8 36.8	-0.0348	.5419	.1667	+40	-33
<i>ω</i> Tauri	6	2.01	9.9	19 16.3	10 55.5	- 5 0.9	+1.1839	.5427	.1597	+90	+39
<i>ω</i> Tauri	5½	1.99	9.4	20 15.8	14 38.2	- 1 25.7	+0.7034	.5434	.1525	+90	+ 7
53 Tauri	6½	1.99	9.1	20 50.0	15 37.0	- 0 28.8	+0.2415	.5435	.1506	+56	-17
56 Tauri	6½	2.00	8.8	21 27.9	15 41.0	- 0 24.9	-0.4252	.5435	.1505	+19	-53
<i>κ</i> Tauri	5½	+1.99	+ 8.4	+22 0.0	18 18.4	+ 2 7.1	-0.6123	.5437	+1458	+ 8	-64
<i>κ</i> Tauri	6½	1.99	8.4	21 54.5	18 19.8	+ 2 8.5	-0.5092	.5437	.1458	+14	-57
<i>ν</i> Tauri	4½	2.00	8.3	22 31.4	18 43.4	+ 2 31.3	-1.1133	.5440	.1445	-27	-63
<i>ν</i> Tauri	6	1.99	8.2	22 42.5	19 10.6	+ 2 57.6	-1.2465	.5440	.1438	-42	-68
B. A. C. 1373	6	1.97	8.6	21 20.2	19 32.2	+ 3 18.5	+0.2782	.5441	.1428	+59	-14
<i>τ</i> Tauri	4½	1.92	7.7	22 42.7	22 2 0.7	+ 9 33.9	-0.3175	.5453	.1300	+25	-44
99 Tauri	6½	+1.87	+ 6.7	+23 44.9	9 4.1	- 7 37.0	-0.5744	.5463	+1152	+10	-59
103 Tauri	6	1.83	6.1	24 5.7	13 44.0	- 3 6.6	-0.4377	.5469	.1050	+17	-49
118 Tauri	6	1.77	5.0	25 2.7	23 16.9	+ 6 6.7	-0.5683	.5479	.0843	+10	-56
121 Tauri	6	1.72	5.2	23 57.2	23 2 5.9	+ 8 50.0	+0.8496	.5480	.0780	+90	+24
125 Tauri	6	1.73	4.3	25 49.4	3 58.8	+10 39.0	-1.0479	.5481	.0736	-23	-64
132 Tauri	5½	+1.65	+ 4.5	+24 31.4	8 11.9	- 9 16.5	+0.6619	.5484	+0.641	+90	+14

## ELEMENTS FOR FACILITATING THE PREDICTION OF OCCULTATIONS OF PLANETS AND STARS BY THE MOON.

### SEPTEMBER.

STAR'S—				AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1872.0. $\Delta\alpha$ $\Delta\delta$	Apparent Declination.	Washington Mean Time.	Hour Angle. <i>H</i>	<i>Y</i>	<i>z'</i>	<i>y'</i>	N'n.	S'n.
139 Tauri	5½	+1.63 + 3.7	+25 56.2	23 12 12.4	- 5 24.2	-0.6452	.5485	+.0550	+ 5	-59
ε Geminorum	3½	1.40 2.1	25 15.4	24 8 57.0	- 9 22.2	-0.7422	.5478	+.0069	+90	+24
37 Geminor.	6	1.35 1.8	25 32.0	14 6.0	- 4 23.8	-0.4417	.5471	-.0049	+71	+ 8
39 Geminor.	6½	1.34 1.4	26 14.8	15 40.2	- 2 52.8	-0.3567	.5471	.0088	+22	-35
40 Geminor.	6½	1.32 1.3	26 5.2	15 58.1	- 2 35.5	-0.1812	.5470	.0093	+31	-25
52 Geminor.	6	1.26 1.1	25 6.2	22 55.5	+ 4 7.8	+0.7822	.5458	.0252	+90	+25
A Geminorum	5½	+1.20 + 0.8	+25 17.7	25 2 56.5	+ 8 0.5	+0.4525	.5451	-.0344	+72	+ 6
B. A. C. 2514	6½	1.13 + 0.6	24 30.6	10 10.5	- 9 0.0	+1.0139	.5434	.0502	+90	+38
c Geminorum	6	1.11 - 0.1	26 5.2	12 24.3	- 6 50.7	-0.8492	.5426	.0559	- 8	-64
κ Geminorum	3½	1.11 + 0.3	24 42.2	12 35.6	- 6 39.8	+0.6716	.5426	.0560	+90	+16
ω¹ Cancri	6	1.02 - 0.5	25 44.5	20 12.7	+ 0 42.1	-0.9674	.5408	.0722	-16	-65
ω² Cancri	6½	1.02 - 0.6	25 26.3	20 35.6	+ 1 4.3	-0.6608	.5405	.0734	+ 4	-61
λ Cancri	6	+0.93 - 0.5	+24 25.4	26 5 25.8	+ 9 37.0	-0.2653	.5378	-.0920	+27	-38
ν¹ Cancri, mult.	7	0.90 0.9	24 57.0	8 18.7	-11 35.8	-1.1225	.5372	.0974	-29	-65
ν² Cancri	6½	0.89 0.8	24 34.0	9 14.5	-10 41.7	-0.7899	.5368	.0994	- 4	-66
ν³ Cancri	6½	0.88 0.8	24 30.6	10 37.1	- 9 21.8	-0.8656	.5362	.1024	- 8	-66
32 Cancri	6	0.86 0.8	24 31.1	11 19.6	- 8 40.7	-0.9471	.5359	.1035	-14	-66
ξ Cancri	5	+0.69 - 1.1	+22 33.7	27 4 50.6	+ 8 16.5	-0.8917	.5305	-.1352	-10	-68
79 Cancri	6	0.68 1.2	22 30.8	5 19.6	+ 8 44.6	-0.9057	.5297	.1376	-10	-68
B. A. C. 3138	6	0.66 1.2	21 48.5	6 56.3	+10 18.3	-0.3495	.5292	.1407	+23	-48
B. A. C. 3292	6½	0.56 1.2	20 52.5	19 25.1	- 1 36.2	-1.2050	.5245	.1620	-35	-69
η Leonis	3½	0.43 1.0	17 23.1	28 9 44.4	-11 43.3	+0.1701	.5198	.1835	+52	-25
42 Leonis	6	+0.38 - 0.8	+15 37.2	17 9.2	- 4 31.8	+0.7153	.5176	-.1934	+90	+ 3
B. A. C. 3579	6	0.36 0.8	14 59.8	20 44.4	- 1 3.1	+0.6977	.5163	.1982	+90	+ 1
i Leonis	6	0.34 0.8	14 47.6	22 28.8	+ 0 38.2	+0.5738	.5159	.2004	-90	- 6
k Leonis	6	0.30 1.0	14 52.2	29 5 50.5	+ 7 46.9	-1.0160	.5139	.2090	+15	-75
l Leonis, mult.	4	+0.19 - 1.0	+11 14.0	30 1 28.4	+ 2 50.4	-1.3360	.5103	-.2282	-45	-79

### OCTOBER.

94 Virginis	6	+0.12 - 2.5	- 8 16.8	3 13 56.6	-11 9.8	-0.9572	.5248	-.2388	-12	-90
95 Virginis	6	0.12 2.6	8 42.1	14 9.3	-10 57.4	-0.5623	.5250	.2387	+11	-78
96 Virginis	6½	0.12 2.7	9 43.7	15 16.2	- 9 52.7	+0.2561	.5255	.2379	+54	-29
κ Virginis	4½	0.14 2.8	9 40.7	17 11.2	- 8 1.2	-0.2508	.5266	.2366	+27	-56
2 Libræ	6	0.18 3.0	11 7.7	22 19.7	- 3 2.3	+0.0726	.5293	.2327	+43	-38
μ Libræ	5	+0.22 - 3.6	-13 36.9	4 10 44.0	+ 8 58.2	-0.1283	.5367	-.2206	+30	-49
ν¹ Libræ	5	0.27 4.2	15 45.6	18 48.6	- 7 13.1	+0.3746	.5420	.2109	+56	-22
ν² Libræ	6½	0.27 4.2	15 59.3	18 53.8	- 7 8.0	+0.5950	.5420	.2109	+70	-10
28 Libræ	6	0.31 4.7	17 41.6	5 1 20.2	- 0 54.4	+1.0447	.5464	.2022	+73	+18
ζ¹ Libræ	4	0.35 4.4	16 16.2	4 42.5	+ 2 21.0	-1.1128	.5488	.1970	-29	-90
ζ² Libræ	7	+0.35 - 4.6	-16 59.9	5 17.9	+ 2 55.1	-0.4691	.5489	-.1963	+10	-72
B. A. C. 5099	7	0.36 4.6	16 48.8	5 34.2	+ 3 10.9	-0.7153	.5493	.1956	- 4	-90
41 Libræ	6	0.39 5.0	18 52.8	9 26.4	+ 6 55.1	+0.6912	.5522	.1895	+71	- 4
κ Libræ	5	0.40 5.1	19 15.8	10 47.6	+ 8 13.5	+0.8348	.5530	.1873	+71	+ 4
λ Libræ	6	0.45 5.3	19 47.0	15 48.8	-10 55.8	+0.4552	.5565	.1786	+57	-17
B. A. C. 5281	6	+0.47 - 5.4	-20 36.5	17 50.2	- 8 58.6	+0.9539	.5582	-.1749	+70	+13
β¹ Scorpii	2	0.51 5.1	19 27.3	21 5.8	- 5 50.0	-0.8044	.5603	.1690	-12	-90
β² Scorpii	5½	0.51 5.1	19 27.0	21 6.0	- 5 49.8	-0.8089	.5603	.1690	-12	-90
ω¹ Scorpii	4½	0.53 5.3	20 19.3	21 40.3	- 5 16.7	-0.0024	.5610	.1678	+31	-42
ω² Scorpii	4½	0.53 5.4	20 31.3	21 55.3	- 5 2.3	+0.1635	.5610	.1674	+39	-33
B. A. C. 5395	6	+0.56 - 5.4	-21 4.4	6 0 37.1	- 2 26.4	+0.2891	.5626	-.1626	+46	-26
ω Ophiuchi	5	0.65 5.3	21 11.5	8 26.9	+ 5 6.3	-0.7938	.5687	.1456	-14	-90
22 Ophiuchi	6½	0.79 5.6	23 18.1	17 50.7	- 9 50.8	+0.1110	.5750	.1245	+33	-36
24 Ophiuchi	6½	0.81 5.6	22 56.8	18 39.3	- 9 4.1	-0.3547	.5754	.1225	+ 7	-64
39 Oph., mult.	6	+0.93 - 5.5	-24 8.8	7 3 15.1	- 0 47.9	-0.0835	.5804	-.1016	+19	-47

ELEMENTS FOR FACILITATING THE PREDICTION OF OCCULTATIONS OF  
PLANETS AND STARS BY THE MOON.

OCTOBER.

STAR'S—				AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1872.0. $\Delta\alpha$ $\Delta\delta$	Apparent Declination.	Washington Mean Time.	Hour Angle. $H$	$Y$	$x'$	$y'$	N'n.	S'n.
B. A. C. 5831	6	+0.93 - 5.6	-23° 55.9	<sup>d</sup> 7 <sup>h</sup> 3 <sup>m</sup> 17.4	- 0 45.7	-0.3084	.5804	-.1016	+ 8	- 61
$\theta$ Ophiuchi	3½	0.96	5.6	4 50.4	+ 0 43.6	+0.5023	.5818	.0973	+52	-14
$b$ Ophiuchi	5	0.98	5.3	24 3.4	+ 2 25.5	+0.5012	.5826	.0926	- 3	-76
$c$ Ophiuchi	5	1.01	5.4	23 51.8	+ 4 22.2	-0.8819	.5838	.0873	-26	-90
63 Ophiuchi	6½	1.15	5.1	24 51.7	-10 43.6	-0.5516	.5880	.0623	- 9	-81
9 Sagittarii	4½	1.21	4.7	24 21.7	- 7 20.5	-1.2633	.5897	.0520	-62	-90
B. A. C. 6217	6½	+1.31 - 4.3	-24 58.5	8 4 17.2	- 0 45.2	-0.9273	.5918	-.0330	-33	-90
$\lambda$ Sagittarii	3	1.36	4.3	25 29.5	+ 1 37.8	-0.4719	.5926	.0254	- 8	-74
B. A. C. 6369	6	1.46	3.6	25 8.5	+ 7 52.9	-0.9302	.5939	.0066	-36	-90
$\phi$ Sagittarii	3½	1.48	4.3	27 7.3	+ 8 8.4	+1.0832	.5942	-.0054	+63	+27
$\sigma$ Sagittarii	2½	1.54	3.6	26 27.2	+11 42.4	+0.4038	.5944	+0.0052	+38	-19
B. A. C. 6490	6½	1.57	2.8	25 1.4	- 9 36.3	-1.0226	.5948	.0137	-42	-90
B. A. C. 6562	6½	+1.65 - 2.8	-26 7.2	9 0 11.3	- 5 39.6	+0.1744	.5948	+0.0250	+26	-32
$\psi$ Sagittarii	5	1.66	2.6	25 28.5	- 4 47.7	-0.4562	.5950	.0286	- 7	-73
$\chi^1$ Sagittarii	6	1.71	1.7	24 45.3	- 1 11.3	-1.0573	.5947	.0399	-42	-90
$\chi^2$ Sagittarii	6½	1.71	1.7	24 39.7	- 1 8.7	-1.1505	.5947	.0399	-50	-90
$\lambda^1$ Sagittarii	6	1.79	1.4	24 59.8	+ 2 46.8	-0.6209	.5943	.0520	-14	-89
$\lambda^2$ Sagittarii	4½	1.79	- 1.4	25 9.8	+ 3 1.6	-0.4387	.5942	.0524	- 4	-71
B. A. C. 7049	6	+2.06 + 1.8	-22 48.8	10 5 49.4	- 1 13.2	-1.1218	.5887	+1.108	-41	-90
17 Capricorni	6	2.11	2.9	21 58.6	+ 5 6.5	-1.1765	.5857	.1284	-44	-90
B. A. C. 7197	6	2.15	2.7	23 12.1	+ 5 55.5	+0.1681	.5857	.1300	+35	-33
$\chi$ Capricorni	6	2.21	4.2	21 42.3	-10 16.7	-0.2008	.5816	.1507	+18	-54
27 Capricorni	6	2.22	4.6	21 4.0	- 9 53.3	-0.7829	.5813	.1513	-13	-90
$\phi$ Capricorni	6	2.26	4.8	21 10.8	- 7 21.2	-0.2892	.5802	.1569	+14	-60
33 Capricorni	6	+2.30 + 5.3	-21 23.6	3 42.8	- 4 11.1	+0.4833	.5781	+1.650	+57	-16
35 Capricorni	6	2.31	5.2	21 44.8	- 2 58.4	+1.0491	.5776	.1676	+68	+20
37 Capricorni	6	2.33	6.1	20 39.1	+ 0 2.6	+0.4838	.5758	.1745	+58	-16
$\epsilon$ Capricorni	4½	2.33	6.4	20 2.2	+ 0 55.9	+0.0260	.5753	.1764	+32	-41
$\kappa$ Capricorni	5	2.33	6.8	19 26.8	+ 3 9.1	-0.1545	.5741	.1810	+23	-51
B. A. C. 7550	6	2.36	6.7	20 12.2	+ 3 22.1	+0.6485	.5737	.1821	+68	- 7
29 Aquarii, <i>mult.</i>	6	+2.41 + 8.4	-17 34.7	19 35.5	+11 8.6	-0.4609	.5691	+1.178	+10	-71
56 Aquarii	6	2.47	10.4	15 14.2	- 1 22.7	-0.3391	.5623	.2180	+18	-62
$\gamma^1$ Aquarii, <i>mult.</i>	6	2.52	11.4	14 43.6	+ 5 56.7	+0.8459	.5582	.2287	+76	+ 4
$\gamma^2$ Aquarii	4	2.51	11.5	14 15.8	+ 6 44.9	+0.5698	.5578	.2299	+70	-12
74 Aquarii	6	2.50	12.1	12 17.6	+ 8 24.6	-1.0148	.5564	.2321	-18	-90
$\psi^1$ Aquarii	4½	2.53	13.6	9 46.9	- 5 58.1	-1.1733	.5517	.2436	-29	-90
$\psi^2$ Aquarii	4½	+2.54 +13.6	- 9 52.7	4 35.9	- 5 4.4	-0.8498	.5513	-.2445	- 6	-90
$\psi^3$ Aquarii	5	2.54	13.6	10 18.4	- 4 37.0	-0.3024	.5512	.2448	+24	-58
B. A. C. 8214	6½	2.57	14.6	8 10.1	+ 2 38.6	-0.5907	.5478	.2516	+10	-80
B. A. C. 8274	6	2.59	15.3	7 5.2	+ 8 24.0	-0.1717	.5453	.2557	+32	-51
30 Piscium	5	2.61	15.7	6 43.3	- 9 36.4	+1.0551	.5433	.2591	+34	+16
33 Piscium	5	2.62	15.8	6 25.2	- 8 5.3	+1.1582	.5429	.2598	+34	+24
B. A. C. 17	6½	+2.62 +16.0	- 5 57.3	4 37.8	- 5 51.0	+1.2921	.5420	+2.608	+34	+37
B. A. C. 81	6½	2.62	16.7	2 55.4	+ 0 33.3	-0.0447	.5400	.2626	+39	-45
14 Ceti	6½	2.62	17.0	1 12.3	+ 5 33.9	-0.1255	.5389	.2634	+20	-67
15 Ceti	6½	2.63	17.1	- 1 12.2	+ 6 43.7	-0.1098	.5386	.2634	+36	-48
26 Ceti, <i>mult.</i>	6½	2.65	17.5	+ 0 41.1	- 5 30.6	+1.1706	.5368	.2622	+90	+25
29 Ceti	6½	2.65	17.7	1 19.6	- 3 35.7	+1.0342	.5367	.2618	+90	+15
33 Ceti	6	+2.66 +17.7	+ 1 46.1	8 59.8	- 2 24.6	+0.9045	.5364	+2.613	+90	+ 6
35 Ceti	6½	2.66	17.7	1 48.0	- 1 30.1	+1.1189	.5364	.2612	+90	+21
$f$ Piscium	6	2.67	17.7	2 56.7	+ 0 54.8	+0.6001	.5363	.2601	+32	-11
B. A. C. 408	6½	2.67	17.7	4 4.4	+ 3 10.6	+0.0513	.5363	.2592	+45	-39
$\mu$ Piscium	4½	2.68	17.8	5 29.3	+ 6 34.2	-0.4889	.5360	.2576	+17	-71
B. A. C. 481	6½	+2.69 +17.7	+ 6 59.7	21 4.2	+ 9 16.4	-1.3183	.5360	+2.529	-40	-83

## ELEMENTS FOR FACILITATING THE PREDICTION OF OCCULTATIONS OF PLANETS AND STARS BY THE MOON.

OCTOBER.

STAR'S—				AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Magn.	Red'ns from 1872.0. $\Delta\alpha$ $\Delta\delta$	Apparent Declination.	Washington Mean Time.	Hour Angle. $H$	$Y$	$x'$	$y'$	N'n.	S'n.
B. A. C. 728	6 $\frac{1}{2}$	+2.71 +17.0	+10° 15.4	16 18 55.4	+ 6 25.2	+0.7306	.5378	+2379	+90	- 1
$\xi$ Arietis	5 $\frac{1}{2}$	2.71 17.0	10 2.0	20 8.6	+ 7 36.0	+1.2517	.5380	.2366	+90	+36
31 Arietis	5 $\frac{1}{2}$	2.72 16.5	11 53.8	17 1 39.6	-11 3.8	+0.6095	.5389	.2300	+83	- 7
$\sigma$ Arietis	6	2.74 15.9	14 33.4	8 36.1	- 4 20.9	-0.5947	.5400	.2213	+11	-71
B. A. C. 1096	6 $\frac{1}{2}$	2.75 13.8	17 24.9	18. 4 18.8	- 9 17.4	+0.4899	.5442	.1917	+73	- 8
13 Tauri	6 $\frac{1}{2}$	2.77 13.1	19 17.5	8 2.2	- 5 41.5	-0.7907	.5450	.1851	- 1	-71
B. A. C. 1242	6	+2.74 +12.2	+19 50.6	16 36.1	+ 2 35.1	+0.1433	.5470	+1693	+51	-23
$\omega^2$ Tauri	5 $\frac{1}{2}$	2.73 11.0	20 15.9	23 54.8	+ 9 38.9	+0.8851	.5487	.1553	+90	+18
53 Tauri	6 $\frac{1}{2}$	2.73 11.0	20 50.0	19 0 52.7	+10 34.9	+0.4178	.5488	.1534	+69	- 8
56 Tauri	6 $\frac{1}{2}$	2.75 10.8	21 27.9	0 56.7	+10 38.7	-0.2354	.5488	.1532	+29	-42
$\kappa^1$ Tauri	5 $\frac{1}{2}$	2.75 10.6	22 0.1	3 31.4	-10 51.9	-0.4189	.5492	.1478	+19	-52
$\kappa^2$ Tauri	6 $\frac{1}{2}$	2.74 10.6	21 54.5	3 32.8	-10 50.5	-0.3163	.5493	.1478	+25	-45
$\nu^1$ Tauri	4 $\frac{1}{2}$	2.75 +10.2	+22 31.4	3 56.0	-10 28.1	-0.9162	.5494	+1472	-11	-68
$\nu^2$ Tauri	6 $\frac{1}{2}$	2.75 10.1	22 42.5	4 22.7	-10 2.3	-1.0481	.5497	.1459	-21	-68
B. A. C. 1373	6	2.73 10.5	21 20.2	4 43.9	- 9 41.9	+0.4678	.5495	.1454	+73	- 5
$\tau$ Tauri	4 $\frac{1}{2}$	2.70 9.3	22 42.7	11 5.7	- 3 33.1	-0.1183	.5507	.1323	+36	-33
B. A. C. 1518	6	2.70 8.1	24 23.2	17 19.4	+ 2 27.7	-1.1358	.5516	.1189	-29	-66
99 Tauri	6 $\frac{1}{2}$	2.68 8.2	23 44.9	18 1.7	+ 3 8.5	-0.3677	.5518	.1171	+22	-46
103 Tauri	6	+2.68 + 7.6	+24 5.7	22 36.7	+ 7 33.9	-0.2283	.5523	+1067	+29	-37
118 Tauri	6	2.61 6.0	25 2.7	20 7 59.6	- 7 22.6	-0.3515	.5532	.0855	+22	-42
121 Tauri	6	2.58 5.9	23 57.2	10 45.8	- 4 42.3	+1.0585	.5532	.0790	+90	+38
125 Tauri	6	2.60 5.0	25 49.5	12 36.8	- 2 55.2	-0.8264	.5532	.0745	- 6	-64
132 Tauri	5 $\frac{1}{2}$	2.54 4.9	24 31.4	16 45.7	+ 1 5.1	+0.8756	.5533	.0649	+90	+27
139 Tauri	5 $\frac{1}{2}$	2.54 4.0	25 56.2	20 42.4	+ 4 53.6	-0.4225	.5533	.0556	+18	-43
$\epsilon$ Geminorum	3 $\frac{1}{2}$	+2.31 + 1.4	+25 15.3	21 17 9.0	+ 0 37.6	+0.9638	.5513	+0072	+90	+38
37 Geminor.	6	2.27 0.8	25 32.0	22 14.2	+ 5 32.2	+0.6653	.5503	-.0048	+90	+20
39 Geminor.	6 $\frac{1}{2}$	2.28 0.4	26 14.8	23 47.3	+ 7 2.1	-0.1292	.5499	.0077	+35	-22
40 Geminor.	6 $\frac{1}{2}$	2.28 + 0.4	26 5.1	22 0 5.0	+ 7 19.2	+0.0455	.5498	.0093	+45	-13
47 Geminor.	6	2.22 - 0.6	27 3.9	5 25.3	-11 31.6	-1.1151	.5487	.0222	-30	-63
52 Geminor.	6	2.17 0.2	25 6.2	6 58.0	-10 2.0	+1.0055	.5482	.0255	+90	+39
A Geminor.	5 $\frac{1}{2}$	+2.13 - 0.7	+25 17.6	10 56.6	- 6 11.6	+0.6773	.5470	-.0346	+90	+18
B. A. C. 2514	6 $\frac{1}{2}$	2.03 1.4	24 30.5	18 7.1	+ 0 44.3	+1.2365	.5448	.0508	+90	+57
$\epsilon$ Geminorum	6	2.04 2.1	26 5.2	20 19.9	+ 2 52.6	-0.6214	.5441	.0556	+ 7	-57
$\kappa$ Geminorum	3 $\frac{1}{2}$	2.02 1.8	24 42.1	20 31.2	+ 3 3.5	+0.8949	.5438	.0565	+90	+29
$\omega^1$ Cancri	6	1.93 3.1	25 44.4	23 4 5.5	+10 22.6	-0.7406	.5413	.0727	0	-64
$\omega^2$ Cancri	6 $\frac{1}{2}$	1.93 2.9	25 26.3	4 28.4	+10 44.8	-0.4350	.5409	.0740	+18	-46
$\psi^2$ Cancri	4	+1.87 - 3.4	+25 53.6	8 31.4	- 9 20.4	-1.2534	.5395	-.0826	-48	-64
$\lambda$ Cancri	6	1.79 3.4	24 25.3	13 16.4	- 4 44.8	-0.0430	.5377	.0919	+40	-26
$\nu^1$ Cancri, <i>mult</i>	7	1.78 3.9	24 57.0	16 8.9	- 1 57.9	-0.8907	.5365	.0979	-11	-65
$\nu^2$ Cancri	6 $\frac{1}{2}$	1.75 3.8	24 34.0	17 4.5	- 1 4.1	-0.5679	.5363	.0999	+10	-57
$\nu^3$ Cancri	6	1.74 4.0	24 30.6	18 27.0	+ 0 15.7	-0.6443	.5356	.1030	+ 6	-62
32 Cancri	6	1.74 4.0	24 31.0	19 9.3	+ 0 56.6	-0.7259	.5354	.1040	+ 1	-66
$\xi$ Cancri	5	+1.48 - 4.9	+22 33.6	24 12 40.3	- 6 6.0	-0.6811	.5278	-.1374	+ 3	-67
79 Cancri	6	1.49 4.9	22 30.8	13 9.4	- 5 37.8	-0.6950	.5278	.1380	+ 2	-68
B. A. C. 3138	6	1.46 4.9	21 48.5	14 46.2	- 4 4.0	-0.1401	.5269	.1410	+34	-36
B. A. C. 3292	6 $\frac{1}{2}$	1.31 5.5	20 52.4	25 3 17.3	+ 8 3.6	-1.0051	.5222	.1618	-16	-69
$\eta$ Leonis	3 $\frac{1}{2}$	1.12 5.1	17 23.1	17 40.5	- 1 59.5	+0.3570	.5167	.1836	+64	-15
42 Leonis	6	1.04 5.1	15 37.1	26 1 7.8	+ 5 14.5	+0.8943	.5144	.1935	+90	+13
B. A. C. 3579	6	+1.00 - 5.0	+14 59.7	4 44.1	+ 8 44.4	+0.8728	.5131	-.1982	+90	+11
$i$ Leonis	6	0.97 5.0	14 47.5	6 29.2	+10 26.4	+0.7466	.5126	.2004	+90	+ 3
$k$ Leonis	6	0.90 5.4	14 52.1	13 53.4	- 6 22.5	-0.8529	.5107	.2090	- 4	-75
$l$ Leonis, <i>mult.</i>	4	0.70 5.2	11 14.0	27 9 37.6	-11 12.7	-1.1995	.5075	.2286	-28	-79
$\zeta$ Virginis	6 $\frac{1}{2}$	0.64 4.8	8 50.5	17 21.4	- 3 42.2	-0.3864	.5069	.2345	-22	-62
$\xi$ Virginis	5	+0.60 - 5.0	+ 8 58.1	20 58.5	- 0 11.4	-1.3766	.5069	-.2372	-50	-81

ELEMENTS FOR FACILITATING THE PREDICTION OF OCCULTATIONS OF  
PLANETS AND STARS BY THE MOON.

## OCTOBER.

STAR'S—				AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1872.0. $\Delta\alpha$ $\Delta\delta$	Apparent Declination.	Washington Mean Time.	Hour Angle $H$	$Y$	$x'$	$y'$	N'n.	S'n.
$\nu$ Virginis	4 $\frac{1}{2}$	+0.60 - 4.6	+ 7 14.7	$\begin{smallmatrix} d & h & m \\ 27 & 21 & 17.3 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ + 0 & 6.9 \end{smallmatrix}$	+0.4172	.5069	-.2374	+67	-19
B. A. C. 4104	6 $\frac{1}{2}$	0.50 4.4	4 45.9	$\begin{smallmatrix} d & h & m \\ 28 & 10 & 59.0 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ -10 & 35.0 \end{smallmatrix}$	-.02100	.5075	.2452	+31	-53
c Virginis	5	0.47 4.4	4 1.5	$\begin{smallmatrix} d & h & m \\ 15 & 36.0 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ - 6 & 6.0 \end{smallmatrix}$	-.05478	.5082	.2472	+14	-76
B. A. C. 4254	6	0.42 4.3	+ 2 33.5	$\begin{smallmatrix} d & h & m \\ 29 & 1 & 4.9 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ + 3 & 6.5 \end{smallmatrix}$	-.13283	.5098	.2501	-41	-88
46 Virginis	6 $\frac{1}{2}$	0.34 3.7	- 2 40.8	$\begin{smallmatrix} d & h & m \\ 12 & 39.2 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ - 9 & 39.4 \end{smallmatrix}$	+1.3608	.5100	.2507	+88	+45
48 Virginis	6	+0.33 - 3.7	- 2 58.5	$\begin{smallmatrix} d & h & m \\ 14 & 22.0 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ - 7 & 59.6 \end{smallmatrix}$	+1.2411	.5137	-.2518	+87	+31

## NOVEMBER.

B. A. C. 5281	6	+0.33 - 4.8	-20 36.5	$\begin{smallmatrix} d & h & m \\ 2 & 0 & 39.9 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ - 0 & 21.4 \end{smallmatrix}$	+0.8557	.5653	-.1785	+70	+ 7
$\beta^1$ Scorpii	2	0.36 4.6	19 27.3	$\begin{smallmatrix} d & h & m \\ 3 & 51.1 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ + 2 & 42.9 \end{smallmatrix}$	-.08898	.5677	.1724	-17	-90
$\beta^2$ Scorpii	5 $\frac{1}{2}$	0.36 4.6	19 27.1	$\begin{smallmatrix} d & h & m \\ 3 & 51.2 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ + 2 & 43.0 \end{smallmatrix}$	-.08931	.5677	.1724	-17	-90
$\omega^1$ Scorpii	4 $\frac{1}{2}$	0.38 4.7	20 19.2	$\begin{smallmatrix} d & h & m \\ 4 & 24.9 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ + 3 & 15.5 \end{smallmatrix}$	-.00968	.5681	.1710	+26	-48
$\omega^2$ Scorpii	4 $\frac{1}{2}$	0.38 4.8	20 31.3	$\begin{smallmatrix} d & h & m \\ 4 & 39.5 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ + 3 & 29.5 \end{smallmatrix}$	+0.0677	.5683	.1707	+34	-38
B. A. C. 5395	6	0.39 4.8	21 4.4	$\begin{smallmatrix} d & h & m \\ 7 & 17.7 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ + 6 & 1.8 \end{smallmatrix}$	+0.1903	.5700	.1657	+40	-32
$\omega$ Ophiuchi	5	+0.47 - 4.7	-21 11.5	$\begin{smallmatrix} d & h & m \\ 14 & 56.7 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ -10 & 36.3 \end{smallmatrix}$	-.08915	.5758	-.1489	-20	-90
VENUS			22 59.0	$\begin{smallmatrix} d & h & m \\ 18 & 31.3 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ - 7 & 9.8 \end{smallmatrix}$	+0.4239	.5277	.1310	+51	-19
22 Ophiuchi	6 $\frac{1}{2}$	0.52 4.9	23 18.0	$\begin{smallmatrix} d & h & m \\ 3 & 0 & 7.9 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ - 1 & 46.1 \end{smallmatrix}$	-.00035	.5820	.1273	+26	-42
24 Ophiuchi	6 $\frac{1}{2}$	0.55 4.9	22 56.7	$\begin{smallmatrix} d & h & m \\ 0 & 55.5 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ - 1 & 0.4 \end{smallmatrix}$	-.04659	.5826	.1252	+ 2	-73
26 Ophiuchi	6	0.58 5.3	24 47.6	$\begin{smallmatrix} d & h & m \\ 2 & 13.3 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ + 0 & 14.4 \end{smallmatrix}$	+1.2586	.5832	.1222	+66	+46
39 Oph., mult.	6	0.65 4.9	24 8.8	$\begin{smallmatrix} d & h & m \\ 9 & 20.2 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ + 7 & 4.6 \end{smallmatrix}$	-.02041	.5873	.1039	+13	-55
B. A. C. 5831	6	+0.64 - 4.9	-23 55.9	$\begin{smallmatrix} d & h & m \\ 9 & 22.5 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ + 7 & 6.8 \end{smallmatrix}$	-.04273	.5878	-.1030	+ 2	-70
$\theta$ Ophiuchi	3 $\frac{1}{2}$	0.64 5.1	24 52.2	$\begin{smallmatrix} d & h & m \\ 10 & 53.5 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ + 8 & 34.1 \end{smallmatrix}$	+0.3756	.5882	.0995	+44	-21
$\delta$ Ophiuchi	5	0.66 4.8	24 3.4	$\begin{smallmatrix} d & h & m \\ 12 & 37.4 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ +10 & 13.9 \end{smallmatrix}$	-.06210	.5892	.0944	-10	-88
$\epsilon^1$ Ophiuchi	5	0.70 4.7	23 51.7	$\begin{smallmatrix} d & h & m \\ 14 & 36.2 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ -11 & 52.0 \end{smallmatrix}$	-1.0005	.5903	.0891	-33	-90
63 Ophiuchi	6 $\frac{1}{2}$	0.80 4.6	24 51.7	$\begin{smallmatrix} d & h & m \\ 23 & 41.8 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ - 3 & 8.3 \end{smallmatrix}$	-.06794	.5943	.0635	-16	-90
B. A. C. 6194	5 $\frac{1}{2}$	0.93 4.8	27 5.3	$\begin{smallmatrix} d & h & m \\ 4 & 8 & 32.0 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ + 5 & 20.2 \end{smallmatrix}$	+1.1340	.5968	.0374	+63	+32
B. A. C. 6217	6 $\frac{1}{2}$	+0.93 - 4.1	-24 58.5	$\begin{smallmatrix} d & h & m \\ 9 & 54.8 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ + 6 & 39.7 \end{smallmatrix}$	-1.0595	.5970	-.0335	-43	-90
$\lambda$ Sagittarii	3	0.96 4.1	25 29.5	$\begin{smallmatrix} d & h & m \\ 12 & 21.7 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ + 9 & 0.6 \end{smallmatrix}$	-.06079	.5974	.0267	-15	-88
B. A. C. 6369	6	1.06 3.6	25 8.5	$\begin{smallmatrix} d & h & m \\ 18 & 47.4 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ - 8 & 49.6 \end{smallmatrix}$	-1.0673	.5980	.0067	-45	-90
$\phi$ Sagittarii	3 $\frac{1}{2}$	1.08 4.1	27 7.3	$\begin{smallmatrix} d & h & m \\ 19 & 3.3 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ - 8 & 34.3 \end{smallmatrix}$	+0.9367	.5980	-.0061	+63	+14
$\sigma$ Sagittarii	2 $\frac{1}{2}$	1.11 3.7	26 27.2	$\begin{smallmatrix} d & h & m \\ 22 & 43.8 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ - 5 & 2.8 \end{smallmatrix}$	+0.2593	.5981	+0.0053	+29	-27
B. A. C. 6490	6 $\frac{1}{2}$	1.15 3.1	25 1.4	$\begin{smallmatrix} d & h & m \\ 5 & 1 & 30.2 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ - 2 & 23.2 \end{smallmatrix}$	-1.1631	.5980	.0139	-52	-90
B. A. C. 6562	6 $\frac{1}{2}$	+1.22 - 3.0	-26 7.3	$\begin{smallmatrix} d & h & m \\ 5 & 24.6 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ + 1 & 31.1 \end{smallmatrix}$	+0.0285	.5976	+0.0262	+18	-41
$\psi$ Sagittarii	5	1.24 2.8	25 28.5	$\begin{smallmatrix} d & h & m \\ 6 & 28.3 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ + 2 & 22.6 \end{smallmatrix}$	-.06006	.5976	.0289	-15	-87
$\chi^1$ Sagittarii	5	1.28 2.4	24 45.3	$\begin{smallmatrix} d & h & m \\ 10 & 12.2 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ + 5 & 57.3 \end{smallmatrix}$	-1.2020	.5968	.0395	-54	-90
$\lambda^1$ Sagittarii	6	1.33 2.0	24 59.9	$\begin{smallmatrix} d & h & m \\ 14 & 18.9 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ + 9 & 53.9 \end{smallmatrix}$	-.07679	.5959	.0516	-22	-90
$\lambda^2$ Sagittarii	4 $\frac{1}{2}$	1.33 - 2.1	25 9.8	$\begin{smallmatrix} d & h & m \\ 14 & 34.1 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ +10 & 8.5 \end{smallmatrix}$	-.05860	.5958	.0527	-12	-85
B. A. C. 7197	6	1.73 + 1.4	23 12.1	$\begin{smallmatrix} d & h & m \\ 6 & 18 & 36.7 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ -10 & 56.3 \end{smallmatrix}$	+0.0186	.5830	.1300	+27	-41
$\chi$ Capricorni	6	+1.79 + 2.6	-21 42.3	$\begin{smallmatrix} d & h & m \\ 7 & 2 & 47.6 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ - 3 & 4.4 \end{smallmatrix}$	-.03510	.5781	+1.499	+10	-64
27 Capricorni	6	1.80 2.9	21 4.1	$\begin{smallmatrix} d & h & m \\ 3 & 12.2 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ - 2 & 40.7 \end{smallmatrix}$	-.09356	.5780	.1505	-23	-90
$\phi$ Capricorni	6	1.84 3.2	21 10.8	$\begin{smallmatrix} d & h & m \\ 5 & 41.6 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ - 0 & 17.4 \end{smallmatrix}$	-.04393	.5762	.1565	+ 6	-70
33 Capricorni	6	1.90 3.5	21 23.6	$\begin{smallmatrix} d & h & m \\ 9 & 12.1 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ + 3 & 5.6 \end{smallmatrix}$	+0.3386	.5740	.1639	+48	-24
35 Capricorni	6	1.91 3.4	21 44.8	$\begin{smallmatrix} d & h & m \\ 10 & 28.6 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ + 4 & 19.2 \end{smallmatrix}$	+0.0084	.5729	.1673	+69	+10
37 Capricorni	6	1.94 4.2	20 39.1	$\begin{smallmatrix} d & h & m \\ 13 & 39.5 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ + 7 & 22.9 \end{smallmatrix}$	+0.3407	.5708	.1737	+49	-24
$\epsilon$ Capricorni	4 $\frac{1}{2}$	+1.92 + 4.6	-20 2.2	$\begin{smallmatrix} d & h & m \\ 14 & 35.7 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ + 8 & 17.0 \end{smallmatrix}$	-.01194	.5703	+1.756	+25	-49
$\kappa$ Capricorni	5	1.95 4.9	19 26.8	$\begin{smallmatrix} d & h & m \\ 16 & 56.2 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ +10 & 32.3 \end{smallmatrix}$	-.03009	.5687	.1801	+16	-60
B. A. C. 7550	6	1.96 4.6	20 12.2	$\begin{smallmatrix} d & h & m \\ 17 & 9.9 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ +10 & 45.5 \end{smallmatrix}$	+0.5079	.5686	.1805	+61	-15
29 Aqua., mult.	6	2.04 6.4	17 34.7	$\begin{smallmatrix} d & h & m \\ 8 & 1 & 22.8 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ - 5 & 19.7 \end{smallmatrix}$	-.06063	.5627	.1963	+ 2	-84
B. A. C. 7818	6 $\frac{1}{2}$	2.15 7.6	17 23.3	$\begin{smallmatrix} d & h & m \\ 11 & 51.5 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ + 4 & 46.5 \end{smallmatrix}$	+1.3483	.5560	.2133	+73	+53
53 Aqua., mult.	6	+2.15 + 7.6	-17 23.4	$\begin{smallmatrix} d & h & m \\ 11 & 51.6 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ + 4 & 46.6 \end{smallmatrix}$	+1.3505	.5560	+2.133	+73	+54
56 Aquarii	6	2.15 8.3	15 14.2	$\begin{smallmatrix} d & h & m \\ 13 & 32.0 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ + 6 & 23.5 \end{smallmatrix}$	-.04773	.5550	.2159	+11	-72
$\tau^1$ Aquarii	6	2.23 9.4	14 43.7	$\begin{smallmatrix} d & h & m \\ 21 & 18.2 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ -10 & 6.5 \end{smallmatrix}$	+0.7249	.5566	.2262	+75	- 3
$\tau^2$ Aquarii	4	2.24 9.6	14 15.8	$\begin{smallmatrix} d & h & m \\ 22 & 9.3 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ - 9 & 17.2 \end{smallmatrix}$	+0.4466	.5499	.2274	+62	-19
74 Aquarii	6	+2.23 +10.4	-12 17.6	$\begin{smallmatrix} d & h & m \\ 23 & 55.3 \end{smallmatrix}$	$\begin{smallmatrix} h & m \\ - 7 & 34.8 \end{smallmatrix}$	-1.1535	.5489	+2.297	-29	-90

## ELEMENTS FOR FACILITATING THE PREDICTION OF OCCULTATIONS OF PLANETS AND STARS BY THE MOON.

NOVEMBER.

STAR'S—				AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1872.0. $\Delta\alpha$ $\Delta\delta$	Apparent Declination.	Washington Mean Time.	Hour Angle. $H$	$Y$	$x'$	$y'$	N'n.	S'n.
$\psi^1$ Aquarii	4 $\frac{1}{2}$	+2.31   +11.9	- 9 46.9	9 10 8.7	+ 2 17.9	-1.3062	.5434	+.2408	-42	-90
$\psi^2$ Aquarii	4 $\frac{1}{2}$	2.32   12.0	9 52.7	11 5.8	+ 3 13.1	-0.9779	.5430	.2418	-14	-90
$\psi^3$ Aquarii	5	2.33   11.9	10 18.4	11 34.9	+ 3 41.2	-0.4239	.5428	.2423	+18	-68
B. A. C. 8214	6 $\frac{1}{2}$	2.38   13.0	8 10.1	19 18.2	+11 9.1	-0.7084	.5394	.2487	+ 3	-90
B. A. C. 8274	6 $\frac{1}{2}$	2.43   13.8	7 5.3	10 1 25.6	- 6 55.5	-0.2782	.5367	.2529	+26	-58
30 Piscium	5	2.46   14.2	6 43.3	7 48.0	- 0 45.5	+0.9707	.5346	.2562	+84	+10
33 Piscium	5	+2.48   +14.4	- 6 25.2	9 24.9	+ 0 48.3	+1.0767	.5340	+.2569	+84	+18
B. A. C. 17	6 $\frac{1}{2}$	2.49   14.6	5 57.4	11 47.7	+ 3 6.5	+1.2148	.5335	.2579	+84	+29
B. A. C. 81	6 $\frac{1}{2}$	2.54   15.6	2 55.4	18 36.3	+ 9 42.0	-0.1298	.5317	.2598	+35	-50
14 Ceti	6 $\frac{1}{2}$	2.57   16.2	1 12.3	23 55.6	- 9 8.9	-0.5084	.5308	.2606	+16	-73
15 Ceti	6 $\frac{1}{2}$	2.58   16.2	- 1 12.2	11 1 9.8	- 7 57.1	-0.1877	.5305	.2607	+32	-53
26 Ceti, <i>mult.</i>	6 $\frac{1}{2}$	2.68   16.5	+ 0 41.1	13 38.5	+ 4 8.0	+1.1233	.5293	.2600	+90	+21
29 Ceti	6 $\frac{1}{2}$	+2.68   +16.9	+ 1 19.6	15 40.1	+ 6 5.8	+0.9876	.5293	+.2595	+90	+12
33 Ceti	6	2.70   17.0	1 46.1	16 55.5	+ 7 18.8	+0.8584	.5292	.2592	+90	+ 4
35 Ceti	6 $\frac{1}{2}$	2.70   17.0	1 47.9	17 53.2	+ 8 14.7	+1.0765	.5292	.2589	+90	+18
$f$ Piscium	6	2.71   17.0	2 56.7	20 26.6	+10 43.3	+0.5551	.5293	.2585	+78	-13
B. A. C. 408	6 $\frac{1}{2}$	2.73   17.3	4 4.4	22 49.7	-10 58.0	+0.0038	.5292	.2571	+42	-42
$\mu$ Piscium	4 $\frac{1}{2}$	2.76   17.5	5 29.3	12 2 25.5	- 7 29.1	-0.5370	.5295	.2556	+14	-74
B. A. C. 481	6 $\frac{1}{2}$	+2.79   +17.8	+ 6 59.7	5 16.9	- 4 43.1	-1.3703	.5298	+.2542	-48	-83
B. A. C. 728	6 $\frac{1}{2}$	2.94   17.4	10 15.4	13 3 32.9	- 7 9.5	+0.7256	.5336	.2371	+90	- 1
$\xi$ Arietis	5 $\frac{1}{2}$	2.95   17.2	10 2.1	4 47.2	- 5 57.6	+1.2523	.5338	.2361	+90	+36
31 Arietis	5 $\frac{1}{2}$	2.99   17.1	11 53.8	10 23.0	- 0 32.6	+0.6114	.5353	.2297	+83	- 7
$\sigma$ Arietis	6	3.02   16.9	14 33.5	17 24.5	+ 6 15.3	-0.5917	.5373	.2213	+11	-71
B. A. C. 1096	6 $\frac{1}{2}$	3.18   14.9	17 24.9	14 13 16.4	+1 28.1	+0.5201	.5436	.1924	+76	- 7
13 Tauri	6 $\frac{1}{2}$	+3.21   +14.3	+19 17.6	17 0.7	+ 5 4.9	-0.7607	.5449	+.1861	+ 1	-68
B. A. C. 1242	6	3.25   13.2	19 50.6	15 1 35.6	-10 37.5	+0.1846	.5476	.1704	+53	-22
$\omega^2$ Tauri	5 $\frac{1}{2}$	3.27   12.2	20 15.9	8 54.3	- 3 33.7	+0.9337	.5499	.1565	+90	+21
53 Tauri	6 $\frac{1}{2}$	3.28   12.0	20 50.1	9 52.0	- 2 37.9	+0.4765	.5502	.1546	+74	- 5
56 Tauri	6 $\frac{1}{2}$	3.29   11.9	21 28.0	9 56.0	- 2 34.1	-0.1872	.5502	.1545	+32	-39
$\kappa^1$ Tauri	5 $\frac{1}{2}$	3.32   11.5	22 0.1	12 30.4	- 0 5.0	-0.3687	.5509	.1490	+22	-49
$\kappa^2$ Tauri	6 $\frac{1}{2}$	+3.32   +11.5	21 54.5	12 31.8	- 0 3.7	-0.2658	.5509	+.1490	+28	-43
$\nu^1$ Tauri	4 $\frac{1}{2}$	3.33   11.5	22 31.4	12 54.9	+ 0 18.7	-0.8662	.5511	.1484	- 7	-68
$\nu^2$ Tauri	6	3.33   11.4	22 42.5	13 21.6	+ 0 44.4	-0.9977	.5513	.1478	-16	-68
B. A. C. 1373	6	3.30   11.4	21 20.2	13 42.7	+ 1 4.8	+0.5200	.5513	.1467	+77	- 2
$\tau$ Tauri	4 $\frac{1}{2}$	3.33   10.4	22 42.7	20 3.3	+ 7 12.4	-0.0616	.5528	.1336	+39	-30
B. A. C. 1518	6	3.37   9.2	24 23.2	16 2 15.2	-10 48.6	-1.0742	.5542	.1201	-24	-66
99 Tauri	6 $\frac{1}{2}$	+3.36   + 9.2	+23 44.9	2 57.3	-10 8.0	-0.3057	.5544	+.1183	+25	-42
103 Tauri	6	3.36   8.4	24 5.8	7 30.6	- 5 44.2	-0.1632	.5553	.1079	+33	-33
118 Tauri	6	3.36   6.6	25 2.7	16 49.5	+ 3 15.1	-0.2836	.5567	.0867	+26	-38
121 Tauri	6	3.33   6.3	23 57.2	19 34.3	+ 5 54.1	+1.1298	.5569	.0801	+90	+44
125 Tauri	6	3.37   5.6	25 49.5	21 24.4	+ 7 40.3	-0.7516	.5569	.0755	- 1	-64
132 Tauri	5 $\frac{1}{2}$	3.34   5.1	24 31.4	17 1 31.1	+11 38.4	+0.9504	.5571	.0658	+90	+32
139 Tauri	5 $\frac{1}{2}$	+3.33   + 4.1	+25 56.2	5 25.7	- 8 35.3	-0.3436	.5572	+.0563	+23	-39
$\epsilon$ Geminorum	3 $\frac{1}{2}$	3.20   + 0.6	25 15.3	18 1 40.5	+10 56.8	+1.0488	.5556	+.0772	+90	+44
37 Geminor.	6	3.15   - 0.3	25 32.0	6 42.8	- 8 11.5	+0.7527	.5549	-.0949	+90	+25
39 Geminor.	6 $\frac{1}{2}$	3.16   0.9	26 14.8	8 14.9	- 6 42.6	-0.0424	.5537	.0084	+40	-17
40 Geminor.	6 $\frac{1}{2}$	3.16   0.9	26 5.1	8 32.5	- 6 25.6	+0.1351	.5535	.0094	+56	- 8
47 Geminor.	6	3.15   2.0	27 3.8	13 49.9	- 1 19.2	-1.0214	.5522	.0219	-21	-63
52 Geminor.	6	+3.10   - 1.8	+25 6.2	15 21.7	+ 0 9.5	+1.0952	.5517	-.0251	+90	+46
$\alpha$ Geminorum	5 $\frac{1}{2}$	3.06   2.6	25 17.6	19 18.3	+ 3 58.0	+0.7688	.5594	.0344	+90	+23
$\epsilon$ Geminorum	6	3.00   4.4	26 5.1	19 4 37.1	-11 2.4	-0.5254	.5469	.0561	+12	-50
$\kappa$ Gemi., <i>mult.</i>	3 $\frac{1}{2}$	2.95   4.0	24 42.1	4 48.3	-10 51.6	+0.9891	.5468	.0565	+90	+35
$\omega^1$ Cancri	6	2.89   5.6	25 44.4	12 19.5	- 3 35.5	-0.6433	.5436	.0723	+ 6	-63
$\omega^2$ Cancri	6 $\frac{1}{2}$	+2.88   - 5.6	+25 26.3	12 42.2	- 3 13.7	-0.3379	.5434	-.0740	+23	-41

ELEMENTS FOR FACILITATING THE PREDICTION OF OCCULTATIONS OF  
PLANETS AND STARS BY THE MOON.

## NOVEMBER.

STAR'S—				AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1872.0. $\Delta\alpha$ $\Delta\delta$	Apparent Declination.	Washington Mean Time.	Hour Angle. $H$	$Y$	$x'$	$y'$	N'n.	S'n.
$\psi^3$ Cancri	4	+2.78 - 6.2	+25° 53.5	19 16 43.8	+ 0 39.9	-1.1550	.5416	-.0827	-33	-64
$\lambda$ Cancri	6	2.77 6.6	24 25.3	21 27.4	+ 5 14.0	+0.0549	.5394	.0929	+46	-21
$\nu^1$ Cancri, <i>mult.</i>	7	2.72 6.8	24 56.9	20 0 19.2	+ 8 0.2	-0.8015	.5382	.0982	- 4	-65
$\nu^2$ Cancri	6½	2.72 7.2	24 33.9	1 14.6	+ 8 53.7	-0.4696	.5377	.1001	+16	-51
$\nu^3$ Cancri	6	2.71 7.4	24 30.5	2 36.8	+10 13.3	-0.5458	.5369	.1031	+12	-56
32 Cancri	6	2.70 7.5	24 31.0	3 19.0	+10 54.1	-0.6275	.5367	.1042	+ 7	-61
$\xi$ Cancri	5	+2.45 - 9.1	+22 33.5	20 48.5	+ 3 50.0	-0.5828	.5278	-.1374	+10	-61
79 Cancri	6	2.45 9.0	22 30.7	21 17.5	+ 4 18.1	-0.5970	.5277	.1381	+ 9	-62
B. A. C. 3138	6	2.42 9.0	21 48.5	22 54.4	+ 5 52.0	-0.0416	.5267	.1410	+40	-31
B. A. C. 3292	6½	2.23 10.0	20 52.3	21 11 27.4	- 5 58.5	-0.9095	.5205	.1620	- 9	-69
$\eta$ Leonis	3½	2.02 10.5	17 23.0	22 1 55.4	+ 8 3.2	+0.4530	.5143	.1831	+71	-10
42 Leonis	6	1.90 10.2	15 37.0	9 26.2	- 8 39.3	+0.9901	.5111	.1929	+90	+19
B. A. C. 3579	6	+1.86 -10.3	+14 59.6	13 4.5	- 5 7.4	+0.9676	.5099	-.1972	+90	+17
$i$ Leonis	6	1.82 10.4	14 47.4	14 50.6	- 3 24.4	+0.8406	.5093	.1994	+90	+ 9
$k$ Leonis	6	1.74 10.8	14 52.0	22 19.4	+ 3 51.4	-0.7674	.5071	.2078	+ 1	-71
$l$ Leonis, <i>mult.</i>	4	1.48 10.7	11 13.9	23 18 18.3	- 0 44.0	-1.1241	.5028	.2268	-22	-79
$\omega$ Virginis	6½	1.40 10.3	8 50.4	24 2 8.4	+ 6 52.7	-0.3109	.5021	.2329	+26	-58
$\xi$ Virginis	5	1.35 10.5	8 58.0	5 48.5	+10 26.6	-1.3077	.5021	.2354	-39	-81
$\nu$ Virginis	4½	+1.35 - 9.8	+ 7 14.6	6 7.6	+10 45.2	+0.4943	.5020	-.2355	+72	-15
B. A. C. 4104	6½	1.20 9.6	4 45.8	20 0.7	+ 0 14.7	-0.1434	.5027	.2434	+35	-50
$c$ Virginis	5	1.15 9.5	4 1.4	25 0 41.4	+ 4 47.4	-0.4853	.5033	.2454	+17	-71
B. A. C. 4254	6	1.06 9.1	+ 2 33.4	10 17.7	- 9 52.8	-1.2741	.5052	.2484	-34	-88
48 Virginis	6	0.95 8.0	- 2 58.6	23 43.8	+ 3 10.2	+1.2948	.5096	.2504	+87	+36
65 Virginis	6	0.87 7.7	4 15.4	26 9 47.0	-11 4.3	+0.1368	.5140	.2499	+49	-35
66 Virginis	6	+0.87 - 7.6	- 4 29.8	10 24.3	-10 28.2	+0.2362	.5146	-.2498	+55	-30
$f$ Virginis	5	0.85 7.4	5 35.8	14 12.3	- 6 46.9	+0.4523	.5162	.2490	+68	-19
80 Virginis	6	0.82 7.8	4 44.7	16 0.8	- 5 1.7	-0.8970	.5171	.2485	- 7	-90
B. A. C. 4647	6	0.76 7.2	7 25.8	27 1 46.1	+ 4 25.7	-0.4732	.5231	.2450	+16	-71
94 Virginis	6	0.72 7.0	8 16.9	7 19.8	+ 9 49.2	-0.9309	.5266	.2421	- 9	-90
95 Virginis	6	0.72 7.0	8 42.2	7 32.3	+10 1.2	-0.5398	.5272	.2419	+12	-76
96 Virginis	6½	+0.73 - 6.6	- 9 43.7	8 38.4	+11 5.3	+0.2674	.5280	-.2413	+55	-28
$\kappa$ Virginis	4½	0.72 6.7	9 40.7	10 31.8	-11 4.9	-0.2397	.5294	.2402	+27	-56
2 Libræ	6	0.68 6.5	11 7.8	15 35.4	- 6 11.0	+0.0694	.5330	.2364	+43	-39
$\mu$ Libræ	5	0.64 6.0	13 47.7	28 3 44.3	+ 5 34.3	+0.0282	.5427	.2253	+39	-41
$\nu^1$ Libræ	5	0.60 5.7	15 45.6	11 35.9	-10 50.1	+0.3225	.5495	.2160	+53	-25
$\nu^2$ Libræ	6½	+0.60 - 5.6	-15 59.3	11 40.9	-10 45.2	+0.5391	.5497	-.2158	+68	-14

## DECEMBER.

MERCURY				-25 19.4	1 14 34.7	-10 44.8	-0.5914	.5820	-.0375	-12	-86
B. A. C. 6194	5½	+0.84	- 4.0	27 5.3	16 19.8	- 9 4.1	+1.1043	.6066	.0388	+63	+28
B. A. C. 6217	6½	0.85	3.7	24 58.2	17 39.9	- 7 47.4	-1.0641	.6070	.0340	-43	-90
λ Sagittarii	3	0.85	3.7	25 29.5	20 2.7	- 5 30.7	-0.6146	.6074	.0269	-15	-89
B. A. C. 6369	6	0.91	3.2	25 8.5	2 2 16.5	+ 0 27.2	-1.0688	.6084	.0072	-46	-90
φ Sagittarii	3½	0.93	3.6	27 7.2	2 31.9	+ 0 42.0	+0.9068	.6084	-.0059	+63	+12
γ Sagittarii	2½	+0.96	- 3.3	-26 27.2	6 5.7	+ 4 6.7	+0.2392	.6084	+0.0050	+28	-29
B. A. C. 6490	6½	0.98	2.9	25 1.4	8 47.1	+ 6 41.3	-1.1639	.6083	.0138	-53	-90
B. A. C. 6562	6½	1.03	2.8	26 7.2	12 44.1	+10 28.1	+0.0108	.6077	.0264	+17	-42
ψ Sagittarii	5	1.03	2.6	25 28.5	13 36.1	+11 18.0	-0.6097	.6077	.0292	-15	-89
χ¹ Sagittarii	6	1.05	2.3	24 45.3	17 13.3	- 9 14.0	-1.2034	.6069	.0401	-55	-90
λ¹ Sagittarii	6	+1.10	- 1.9	-24 59.9	21 12.7	- 5 24.7	-0.7755	.6058	+0.0525	-22	-90
λ² Sagittarii	4½	1.11	- 2.0	25 9.8	21 27.4	- 5 10.6	-0.5959	.6056	.0538	-12	-86
B. A. C. 7197	6	1.39	+ 0.5	23 12.1	4 0 44.6	- 3 0.9	0.0000	.5907	.1317	+26	-42
B. A. C. 7237	6	1.43	0.3	24 15.7	2 32.8	- 1 17.0	+1.3032	.5893	.1365	+66	+53
χ Capricorni	6	+1.47	+ 1.0	-21 42.4	8 44.5	+ 4 40.0	-0.3654	.5848	+1.516	+ 1	-65

## ELEMENTS FOR FACILITATING THE PREDICTION OF OCCULTATIONS OF PLANETS AND STARS BY THE MOON.

DECEMBER.

STAR'S—				AT CONJUNCTION IN R. A.							Limiting Parallels.	
Name.	Mag.	Red'ns from 1872.0.		Apparent Declination.	Washington Mean Time.	Hour Angle. <i>H</i>	<i>Y</i>	<i>z'</i>	<i>y'</i>	N'n.	S'n.	
		$\Delta\alpha$	$\Delta\delta$		<sup>d</sup> <sup>h</sup> <sup>m</sup>	<sup>h</sup> <sup>m</sup>						
27 Capricorni	6	+1.47	+ 1.7	-21° 4.1	4 9 8.5	+ 5 3.0	-0.9443	.5845	+1524	-23	-90	
♄ Capricorni	6	1.50	2.0	21 10.8	11 34.8	+ 7 23.5	-0.4529	.5824	.1583	+ 6	-71	
33 Capricorni	6	1.53	2.2	21 23.6	15 1.2	+10 42.0	+0.3178	.5797	.1657	+47	-25	
35 Capricorni	6	1.56	2.2	21 44.9	16 16.3	+11 54.2	+0.8829	.5788	.1683	+69	+ 8	
37 Capricorni	6	1.60	2.9	20 39.2	19 23.7	- 9 5.5	+0.3206	.5761	.1755	+48	-25	
ε Capricorni	4½	1.60	3.2	20 2.2	20 18.9	- 8 12.4	-0.1358	.5756	.1769	+24	-50	
κ Capricorni	5	+1.62	+ 3.6	-19 26.8	22 37.1	- 5 59.4	-0.3157	.5735	+1819	+15	-61	
B. A. C. 7550	6	1.62	3.3	20 12.3	22 50.6	- 5 46.4	-0.4869	.5733	.1823	+59	-16	
20 Aquaa., <i>mult.</i>	6	1.70	4.9	17 34.7	5 6 56.3	+ 2 1.2	-0.6187	.5666	.1974	+ 1	-85	
B. A. C. 7818	6½	1.82	5.8	17 23.3	17 18.3	-11 59.2	+1.3274	.5586	.2141	+73	+48	
53 Aqua., <i>mult.</i>	6	1.82	5.8	17 23.4	17 18.4	-11 59.2	+1.3289	.5586	.2141	+73	+48	
56 Aquarii	6	1.83	6.6	15 14.2	18 57.9	-10 23.3	-0.4906	.5572	.2167	+11	-73	
♈ Aqua., <i>mult.</i>	6	+1.90	+ 7.4	-14 43.7	6 2 41.2	- 2 56.1	+0.7086	.5512	+2270	+75	- 5	
♈ Aquarii	4	1.91	7.5	14 15.9	3 32.1	- 2 7.0	+0.4314	.5504	.2281	+61	-19	
74 Aquarii	6	1.91	8.4	12 17.7	5 17.7	- 0 25.1	-1.1644	.5494	.2300	-30	-90	
♊ Aquarii	4½	2.00	9.9	9 46.9	15 30.3	+ 9 26.8	-1.3170	.5424	.2407	-44	-90	
♊ Aquarii	4½	2.01	9.9	9 52.7	16 27.4	+10 22.0	-0.9895	.5420	.2416	-15	-90	
♊ Aquarii	5	2.02	9.7	10 18.4	16 56.5	+10 50.1	-0.4358	.5416	.2419	+17	-68	
B. A. C. 8214	6½	+2.10	+10.9	- 8 10.2	7 0 41.2	- 5 40.5	-0.7196	.5372	+2479	+ 3	-90	
B. A. C. 8274	6½	2.15	11.5	7 5.3	6 50.6	+ 0 16.9	-0.2884	.5342	.2517	+26	-59	
30 Piscium	5	2.22	12.0	6 43.3	13 16.0	+ 6 29.9	+0.9645	.5313	.2547	+84	+10	
33 Piscium	5	2.23	12.2	6 25.2	14 53.8	+ 8 4.6	+1.0713	.5306	.2553	+84	+17	
B. A. C. 17	6½	2.26	12.4	5 57.4	17 18.0	+10 24.2	+1.2106	.5299	.2560	+84	+38	
B. A. C. 81	6½	2.32	13.7	2 55.4	8 0 11.3	- 6 55.6	-0.1376	.5275	.2579	+35	-50	
14 Ceti	6½	+2.39	+14.4	- 1 12.3	5 34.9	- 1 42.1	-0.5175	.5259	+2584	+14	-74	
15 Ceti	6½	2.38	14.5	- 1 12.2	6 50.2	- 0 29.2	-0.1951	.5257	.2585	+32	-53	
26 Ceti, <i>mult.</i>	6½	2.51	15.1	+ 0 41.0	19 30.8	+11 47.7	+1.1259	.5237	.2573	+90	+21	
29 Ceti	6½	2.53	15.4	1 19.6	21 34.6	-10 12.3	+0.9897	.5236	.2567	+90	+12	
33 Ceti	6	2.55	15.4	1 46.1	22 51.2	- 8 58.0	+0.8600	.5235	.2564	+90	+ 4	
35 Ceti	6½	2.56	15.4	1 47.9	23 50.1	- 8 1.0	+1.0797	.5235	.2561	+90	+18	
♓ Piscium	6	+2.58	+15.7	+ 2 56.6	9 2 26.2	- 5 29.7	+0.5551	.5232	+2553	+77	-13	
B. A. C. 408	6½	2.60	16.1	4 4.4	4 51.9	- 3 8.5	0.0000	.5234	.2544	+42	-42	
♊ Piscium	4½	2.64	16.5	5 29.2	8 31.9	+ 0 24.7	-0.5445	.5235	.2527	+14	-75	
B. A. C. 481	6½	2.69	17.0	6 59.7	11 26.6	+ 3 14.0	-1.3836	.5235	.2512	-50	-83	
B. A. C. 728	6½	2.93	16.8	10 13.4	10 10 9.7	+ 1 14.9	+0.7295	.5271	.2343	+90	- 1	
ξ Arietis	5½	2.94	16.7	10 2.0	11 25.6	+ 2 28.4	+1.2601	.5271	.2341	+90	+36	
31 Arietis	5½	+3.01	+16.7	+11 53.8	17 8.2	+ 8 0.3	+0.6146	.5290	+2273	+83	- 6	
σ Arietis	6	3.12	16.7	14 33.5	11 0 18.1	- 9 3.5	-0.5987	.5312	.2190	+10	-71	
B. A. C. 1096	6½	3.35	15.2	17 24.9	20 31.8	+10 31.2	+0.5201	.5388	.1902	+76	- 7	
13 Tauri	6½	3.41	15.1	19 17.6	12 0 19.7	- 9 48.4	-0.7707	.5401	.1845	0	-71	
B. A. C. 1242	6	3.50	14.0	19 50.6	9 2.4	- 1 23.0	+0.1800	.5435	.1692	+53	-22	
ω Tauri	5½	3.57	12.8	20 15.9	16 27.0	+ 5 46.8	+0.9322	.5465	.1551	+90	+21	
53 Tauri	6½	+3.59	+12.7	+20 50.1	17 25.5	+ 6 43.2	+0.4720	.5468	+1531	+73	- 5	
56 Tauri	6½	3.60	12.9	21 28.0	17 29.5	+ 6 47.1	-0.1959	.5468	.1531	+31	-40	
κ Tauri	5½	3.64	12.4	22 0.1	20 5.8	+ 9 18.1	-0.3788	.5476	.1483	+21	-50	
κ Tauri	6½	3.63	12.4	21 54.5	20 7.2	+ 9 19.4	-0.2754	.5476	.1483	+27	-43	
ν Tauri	4½	3.65	12.4	22 31.5	20 30.6	+ 9 42.1	-0.8792	.5480	.1471	- 8	-68	
ν Tauri	6	3.66	12.3	22 42.5	20 57.6	+10 8.2	-1.0116	.5481	.1465	-18	-68	
B. A. C. 1373	6	+3.63	+12.0	+21 20.2	21 19.0	+10 28.8	+0.5147	.5493	+1460	+76	- 2	
τ Tauri	4½	3.70	11.0	22 42.7	13 3 43.7	- 7 19.5	-0.0715	.5503	.1325	+38	-31	
B. A. C. 1518	6	3.79	10.1	24 23.2	9 59.0	- 1 17.1	-1.0902	.5523	.1193	-25	-66	
99 Tauri	6½	3.77	10.0	23 45.0	10 41.5	- 0 36.1	-0.3184	.5526	.1176	+25	-43	
103 Tauri	6	3.80	9.0	24 5.8	15 17.0	+ 3 49.9	-0.1766	.5539	.1078	+32	-34	
118 Tauri	6	+3.85	+ 7.2	+25 2.8	14 0 39.4	-11 7.2	-0.2970	.5559	+0461	+25	-39	



ELEMENTS FOR FACILITATING THE PREDICTION OF OCCULTATIONS OF  
PLANETS AND STARS BY THE MOON.

DECEMBER.

STAR'S—				AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'n's from 1872.0. $\Delta\alpha$ $\Delta\delta$	Apparent Declination.	Washington Mean Time.	Hour Angle. $H$	$Y$	$x'$	$y'$	N'n.	S'n.
121 Tauri	6	+3.84 + 6.6	+23 57.2	14 3 25.1	- 8 27.3	+1.1176	.5563	+.0795	+90	+43
125 Tauri	6	3.90 6.2	25 49.5	5 15.6	- 6 40.7	-.7707	.5565	.0756	- 2	-64
132 Tauri	5 $\frac{1}{2}$	3.86 5.4	24 31.4	9 23.3	- 2 41.6	+.09352	.5571	.0653	+90	+31
139 Tauri	5 $\frac{1}{2}$	3.91 4.6	25 56.2	13 18.6	+ 1 5.4	-.3639	.5573	.0565	+22	-40
$\epsilon$ Geminorum	3 $\frac{1}{2}$	3.90 + 0.2	25 15.3	15 9 34.4	- 3 21.5	+1.0240	.5565	+.0068	+90	+42
37 Geminor.	6	3.88 - 0.8	25 32.0	14 36.4	+ 1 29.9	+.7253	.5557	-.0052	+90	+23
39 Geminor.	6 $\frac{1}{2}$	+3.90 - 1.4	+26 14.8	16 8.4	+ 2 58.7	-.0687	.5555	-.0088	+38	-19
40 Geminor.	6 $\frac{1}{2}$	3.89 1.4	26 5.1	16 26.0	+ 3 15.8	+.01058	.5553	.0099	+48	-10
47 Geminor.	6	3.92 2.6	27 3.8	21 42.7	+ 8 21.4	-1.0541	.5541	.0224	-24	-63
52 Geminor.	6	3.85 2.7	25 5.2	23 14.3	+ 9 49.8	+1.0644	.5536	.0257	+90	+43
A Geminorum	5 $\frac{1}{2}$	3.83 3.6	25 17.6	16 3 10.4	-10 22.2	+.7359	.5525	.0351	+90	+21
$\epsilon$ Geminorum	6	3.80 5.7	26 5.1	12 27.6	- 1 24.2	-.5638	.5489	.0569	+10	-53
$\kappa$ Geml., mult.	3 $\frac{1}{2}$	+3.76 - 5.5	+24 42.1	12 38.7	- 1 13.5	+.09517	.5488	-.0572	+90	+32
$\omega^1$ Cancri	6	3.75 7.2	25 44.4	20 8.6	+ 6 1.3	-.6852	.5460	.0737	+ 3	-63
$\omega^2$ Cancri	6 $\frac{1}{2}$	3.73 7.2	25 26.2	20 31.2	+ 6 23.1	-.3796	.5456	.0749	+21	-43
$\psi^1$ Cancri	4	3.72 8.1	25 53.5	17 0 32.1	+10 15.9	-1.2003	.5449	.0815	-39	-64
$\lambda$ Cancri	6	3.63 8.6	24 25.3	5 14.8	- 9 10.8	+.0095	.5420	.0932	+43	-23
$\nu^1$ Cancri, mult.	7	3.63 9.4	24 56.9	8 6.0	- 6 25.2	-.8488	.5403	.0991	- 7	-65
$\nu^2$ Cancri	6 $\frac{1}{2}$	+3.61 - 9.5	+24 33.9	9 1.3	- 5 31.8	-.5171	.5398	-.1010	+13	-54
$\nu^3$ Cancri	6	3.60 9.7	24 30.5	10 23.3	- 4 12.5	-.5942	.5389	.1042	+ 9	-59
32 Cancri	6	3.59 9.8	24 30.9	11 5.4	- 3 31.7	-.6761	.5388	.1051	+ 4	-64
$\xi$ Cancri	5	3.36 12.3	22 33.5	18 4 32.9	-10 38.0	-.6402	.5293	.1384	+ 7	-65
79 Cancri	6	3.36 12.5	22 30.6	5 2.0	-10 9.7	-.6548	.5292	.1390	+ 6	-66
B. A. C. 3138	6	3.31 12.4	21 48.3	6 38.8	- 8 36.1	-.0991	.5281	.1419	+37	-34
B. A. C. 3892	6 $\frac{1}{2}$	+3.16 -13.9	+20 52.2	19 12.1	+ 3 34.0	-.9750	.5214	-.1623	-14	-69
$\gamma$ Leonis	3 $\frac{1}{2}$	2.94 15.1	17 22.9	19 9 42.7	- 6 21.7	+.03851	.5139	.1833	+66	-14
42 Leonis	6	2.83 15.1	15 36.9	17 16.0	+ 0 58.3	+.09219	.5103	.1927	+90	+15
B. A. C. 3579	6	2.80 15.4	14 59.5	20 55.8	+ 4 31.6	+.08980	.5087	.1972	+90	+13
$\epsilon$ Leonis	6	2.77 15.4	14 47.3	22 42.6	+ 6 15.3	+.7698	.5078	.1993	+90	+ 5
$k$ Leonis	6	2.69 16.3	14 51.9	20 6 15.2	-10 25.1	-.8482	.5051	.2073	- 4	-75
$\epsilon$ Leonis, mult.	4	+2.43 -16.7	+11 13.8	21 2 28.2	+ 9 13.6	-1.2151	.4992	-.2256	-30	-79
$\omega$ Virginis	6 $\frac{1}{2}$	2.31 16.3	8 50.3	10 25.4	- 7 2.6	-.3983	.4980	.2312	+22	-63
$\xi$ Virginis	5	2.28 16.4	8 57.9	14 9.2	- 3 24.9	-1.4031	.4975	.2334	-59	-81
$\nu$ Virginis	4 $\frac{1}{2}$	2.23 15.9	7 14.5	14 28.6	- 3 6.1	+.04124	.4975	.2338	+67	-20
B. A. C. 4104	6 $\frac{1}{2}$	2.10 15.6	4 45.7	22 4 37.0	+10 38.8	-.2320	.4971	.2408	+30	-55
$\epsilon$ Virginis	5	2.04 15.4	4 1.3	9 23.3	- 8 42.8	-.5770	.4976	.2427	+12	-78
B. A. C. 4254	6	+1.96 -15.3	+ 2 33.3	19 11.8	+ 0 49.3	-1.3728	.4990	-.2454	-47	-88
46 Virginis	6 $\frac{1}{2}$	1.83 13.6	- 2 41.0	23 7 9.7	-11 33.0	+1.3431	.5023	.2469	+88	+42
48 Virginis	6	1.82 13.6	2 58.7	8 55.9	- 9 49.8	+1.2218	.5030	.2471	+87	+29
65 Virginis	6	1.73 13.2	4 15.5	19 12.8	+ 0 9.5	+.0554	.5070	.2462	+45	-39
66 Virginis	6	1.72 13.2	4 29.9	19 51.0	+ 0 46.6	+.0557	.5073	.2461	+50	-34
$\delta$ Virginis	5	1.69 12.8	5 35.9	23 44.2	+ 4 33.0	+.3752	.5094	.2454	+64	-23
80 Virginis	6	+1.66 -13.0	- 4 44.8	24 1 35.1	+ 6 20.6	-.9856	.5104	-.2449	-12	-90
B. A. C. 4647	6	1.58 13.2	7 25.8	11 33.5	- 7 58.8	-.5537	.5164	.2414	+12	-77
94 Virginis	6	1.52 11.7	8 17.0	17 14.3	- 2 28.2	-1.0127	.5200	.2386	-15	-90
95 Virginis	6	1.52 11.6	8 42.3	17 27.1	- 2 15.9	-.6180	.5205	.2384	+ 8	-83
96 Virginis	6 $\frac{1}{2}$	1.51 11.3	9 43.8	18 34.5	- 1 10.5	+.01964	.5212	.2377	+50	-32
$\kappa$ Virginis	4 $\frac{1}{2}$	1.50 11.2	9 40.8	20 30.3	+ 0 41.7	-.3138	.5228	.2367	+23	-60
2 Libræ	5	+1.46 -10.8	-11 7.9	25 1 39.9	+ 5 41.6	+.00005	.5266	-.2331	+39	-42
$\mu$ Libræ	6	1.37 9.7	13 37.0	14 2.0	- 6 20.0	-.2184	.5369	.2223	+26	-55
$\nu^1$ Libræ	5	1.33 8.9	15 45.7	22 1.1	+ 1 23.3	+.02689	.5442	.2134	+51	-28
$\nu^2$ Libræ	5 $\frac{1}{2}$	1.33 8.9	15 59.4	22 6.1	+ 1 28.1	+.04874	.5444	.2133	+63	-16
28 Libræ	6	1.29 8.3	17 41.7	26 4 25.8	+ 7 34.9	+.09230	.5512	.2049	+73	+ 9
$\zeta^1$ Libræ	4	+1.27 - 8.6	-16 16.3	7 43.7	+10 45.9	-1.2120	.5541	-.2001	-38	-90

ELEMENTS FOR FACILITATING THE PREDICTION OF OCCULTATIONS OF  
PLANETS AND STARS BY THE MOON.

DECEMBER.

STAR'S—				AT CONJUNCTION IN R. A.							Limiting Parallels.	
Name.	Mag.	Red'ns from 1872.0. $\Delta\alpha$ $\Delta\delta$		Apparent Declination.	Washington Mean Time.	Hour Angle. $H$	$Y$	$x'$	$y'$	N'n.	S'n.	
$\zeta$ Libræ	7	+1.26	- 8.4	-17° 0.0	26 8 18.3	+11 19.3	-0.5768	.5544	-1994	+ 4	-81	
B. A. C. 5099	7	1.25	8.4	16 48.8	8 34.3	+11 34.7	-0.8204	.5549	.1988	-10	-90	
41 Libræ	6	1.23	7.7	18 52.8	12 20.6	- 8 46.9	+0.5635	.5585	.1932	+65	-12	
$\kappa$ Libræ	5	1.24	7.6	19 15.9	13 39.6	- 7 30.7	+0.7034	.5600	.1907	+71	- 4	
$\lambda$ Libræ	6	1.22	7.3	19 47.1	18 31.9	- 2 48.9	+0.3246	.5653	.1823	+49	-25	
B. A. C. 5281	6	1.21	7.0	20 36.6	20 29.4	- 0 55.7	+0.8130	.5674	.1786	+70	+ 3	
$\beta$ Scorpii	2	+1.20	- 7.1	-19 27.3	23 38.3	+ 2 6.2	-0.9173	.5704	-1737	-19	-90	
$\beta$ Scorpii	5 $\frac{1}{2}$	1.20	7.1	19 27.1	23 38.5	+ 2 6.4	-0.9217	.5704	.1727	-19	-90	
$\omega$ Scorpii	4 $\frac{1}{2}$	1.19	6.9	20 19.3	27 0 11.6	+ 2 38.3	-0.1298	.5708	.1719	+24	-50	
$\omega$ Scorpii	4 $\frac{1}{2}$	1.19	6.9	20 31.4	0 26.1	+ 2 52.2	+0.0330	.5713	.1711	+32	-40	
B. A. C. 5395	6	1.19	6.5	21 4.4	3 1.9	+ 5 22.1	+0.1541	.5730	.1659	+38	-34	
$\omega$ Ophiuchi	5	1.15	6.1	21 11.5	10 32.5	-11 24.4	-0.9103	.5816	.1496	-21	-90	
22 Ophiuchi	6 $\frac{1}{2}$	+1.15	- 5.5	-23 18.0	19 30.1	- 2 47.9	-0.1204	.5899	-1280	+20	-50	
24 Ophiuchi	6 $\frac{1}{2}$	1.14	5.5	22 56.8	20 16.4	- 2 3.5	-0.4822	.5906	.1266	+ 1	-74	
26 Ophiuchi	6	1.14	- 5.2	24 47.7	21 32.0	- 0 50.9	+1.2190	.5921	-1229	+66	+40	
B. A. C. 7049	6	1.26	+ 0.4	22 48.8	31 2 30.2	+ 0 50.4	-1.1899	.6065	+1157	-47	-90	
17 Capricorni	6	1.31	1.1	21 58.6	8 44.8	+ 6 49.2	-1.2382	.6024	.1330	-51	-90	
B. A. C. 7197	6	+1.32	+ 0.8	-23 12.2	9 33.2	+ 7 35.6	+0.0770	.6016	+1353	+30	-38	
$\gamma$ Capricorni	6	1.39	1.6	21 42.4	17 16.6	- 9 0.0	-0.2758	.5962	.1551	+14	-59	
27 Capricorni	6	1.35	1.8	21 4.1	17 39.8	- 8 37.8	-0.8451	.5957	.1564	-17	-90	
$\phi$ Capricorni	6	1.37	1.9	21 10.8	20 1.1	- 6 22.3	-0.3591	.5939	.1620	+11	-64	
33 Capricorni	6	+1.40	+ 2.2	-21 23.5	23 20.2	- 3 11.2	+0.4029	.5913	+1697	+52	-20	

NOTE.—B. A. C. British Association Catalogue.

# 452 JUPITER'S SATELLITES, 1872.

WASHINGTON MEAN TIME.

## JANUARY.

I. Eclipse	Disapp.	d	h	m	s		II. Transit	Egress W.	d	h	m	s
I. Occult.	Reapp.	1	0	8	25.1		I. Shadow	Ingress	8	12	4	
II. Shadow	Ingress	1	2	46			I. Transit	Ingress	8	23	20	
II. Transit	Ingress W.	1	6	15			III. Eclipse	Disapp.	8	23	35	26.4
II. Shadow	Egress W.	1	9	12			I. Shadow	Egress	9	1	39	
II. Transit	Egress W.	1	9	51			I. Transit	Egress	9	1	48	
III. Eclipse	Disapp.	1	19	36	49.3		III. Occult.	Reapp.	9	3	36	
I. Shadow	Ingress	1	21	26			I. Eclipse	Disapp.	9	20	30	51.2
I. Transit	Ingress	1	21	46			I. Occult.	Reapp.	9	22	56	
I. Shadow	Egress	1	23	45			II. Eclipse	Disapp.	10	3	57	25.5
I. Transit	Egress	2	0	5			II. Occult.	Reapp. W.	10	7	5	
III. Occult.	Reapp.	2	0	21			I. Shadow	Ingress W.	10	17	48	
I. Eclipse	Disapp.	2	18	36	53.4		I. Transit	Ingress W.	10	17	55	
I. Occult.	Reapp.	2	21	12			I. Shadow	Egress	10	20	7	
II. Eclipse	Disapp.	3	1	21	3.2		I. Transit	Egress	10	20	14	
II. Occult.	Reapp.	3	4	50			I. Eclipse	Disapp. W.	11	14	59	20.4
I. Shadow	Ingress W.	3	15	54			I. Occult.	Reapp.	11	17	21	
I. Transit	Ingress W.	3	16	11			II. Shadow	Ingress	11	22	7	
I. Shadow	Egress W.	3	18	13			II. Transit	Ingress	11	22	16	
I. Transit	Egress W.	3	18	30			II. Shadow	Egress	12	1	2	
I. Eclipse	Disapp. W.	4	13	5	20.4		II. Transit	Egress	12	1	11	
I. Occult.	Reapp. W.	4	15	38			I. Shadow	Ingress W.	12	12	17	
II. Shadow	Ingress	4	19	32			I. Transit	Ingress W.	12	12	21	
II. Transit	Ingress	4	20	3			III. Shadow	Ingress W.	12	13	30	
II. Shadow	Egress	4	22	27			III. Transit	Ingress W.	12	13	43	
II. Transit	Egress	4	22	58			I. Shadow	Egress W.	12	14	36	
III. Shadow	Ingress W.	5	9	31			I. Transit	Egress W.	12	14	40	
I. Shadow	Ingress W.	5	10	23			III. Shadow	Egress W.	12	16	58	
III. Transit	Ingress W.	5	10	27			III. Transit	Egress W.	12	17	13	
I. Transit	Ingress W.	5	10	37			I. Occult.	Disapp. W.	13	9	28	
I. Shadow	Egress W.	5	12	42			I. Occult.	Reapp. W.	13	11	47	
I. Transit	Egress W.	5	12	56			II. Eclipse	Disapp. W.	13	17	15	57.7
III. Shadow	Egress W.	5	12	58			II. Occult.	Reapp.	13	20	12	
III. Transit	Egress W.	5	13	57			I. Shadow	Ingress W.	14	6	45	
I. Eclipse	Disapp. W.	6	7	33	52.2		I. Transit	Ingress W.	14	6	46	
I. Occult.	Reapp. W.	6	10	4			I. Shadow	Egress W.	14	9	5	
II. Eclipse	Disapp. W.	6	14	39	36.7		I. Transit	Egress W.	14	9	6	
II. Occult.	Reapp. W.	6	17	58			I. Occult.	Disapp.	15	3	54	
I. Shadow	Ingress	7	4	51			I. Occult.	Reapp. W.	15	6	13	
I. Transit	Ingress	7	5	3			II. Transit	Ingress W.	15	11	22	
I. Shadow	Egress W.	7	7	10			II. Shadow	Ingress W.	15	11	24	
I. Transit	Egress W.	7	7	22			II. Transit	Egress W.	15	14	17	
IV. Eclipse	Disapp. W.	7	12	31	17.7		II. Shadow	Egress W.	15	14	19	
IV. Occult.	Reapp. W.	7	18	21			IV. Transit	Ingress	15	20	20	
I. Eclipse	Disapp.	8	2	2	20.3		IV. Shadow	Ingress	15	20	38	
I. Occult.	Reapp.	8	4	30			IV. Transit	Egress	16	0	31	
II. Shadow	Ingress W.	8	8	49			IV. Shadow	Egress	16	0	43	
II. Transit	Ingress W.	8	9	9			I. Transit	Ingress	16	1	12	
II. Shadow	Egress W.	8	11	44			I. Shadow	Ingress	16	1	14	

# JUPITER'S SATELLITES, 1872. 453

WASHINGTON MEAN TIME.

JANUARY.

		d	h	m	s			d	h	m	s
III. Occult.	Disapp.	16	3	21		IV. Occult.	Disapp.	24	4	12	
I. Transit	Egress	16	3	32		II. Occult.	Disapp. W.	24	8	39	
I. Shadow	Egress	16	3	33		IV. Eclipse	Reapp. W.	24	10	34	22.2
III. Eclipse	Reapp. W.	16	6	53	35.4	II. Eclipse	Reapp. W.	24	12	0	46.5
I. Occult.	Disapp.	16	22	19		I. Transit	Ingress	24	21	22	
I. Eclipse	Reapp.	17	0	39	34.9	I. Shadow	Ingress	24	21	36	
II. Occult.	Disapp. W.	17	6	24		I. Transit	Egress	24	23	42	
II. Eclipse	Reapp. W.	17	9	24	28.1	I. Shadow	Egress	24	23	56	
I. Transit	Ingress	17	19	38		I. Occult.	Disapp.	25	18	29	
I. Shadow	Ingress	17	19	42		I. Eclipse	Reapp.	25	21	2	33.0
I. Transit	Egress	17	21	58		II. Transit	Ingress	26	2	43	
I. Shadow	Egress	17	22	2		II. Shadow	Ingress	26	3	17	
I. Occult.	Disapp.	18	17	45		II. Transit	Egress W.	26	5	38	
I. Eclipse	Reapp.	18	19	8	57.8	II. Shadow	Egress W.	26	6	12	
II. Transit	Ingress	19	0	29		I. Transit	Ingress W.	26	15	48	
II. Shadow	Ingress	19	0	42		I. Shadow	Ingress W.	26	16	5	
II. Transit	Egress	19	3	24		I. Transit	Egress	26	18	8	
II. Shadow	Egress	19	3	37		I. Shadow	Egress	26	18	25	
I. Transit	Ingress W.	19	14	4		III. Transit	Ingress	26	20	16	
I. Shadow	Ingress W.	19	14	11		III. Shadow	Ingress	26	21	29	
I. Transit	Egress W.	19	16	24		III. Transit	Egress	26	23	45	
I. Shadow	Egress W.	19	16	31		III. Shadow	Egress	27	0	58	
III. Transit	Ingress W.	19	16	59		I. Occult.	Disapp. W.	27	12	55	
III. Shadow	Ingress W.	19	17	29		I. Eclipse	Reapp. W.	27	15	31	13.8
III. Transit	Egress	19	20	28		II. Occult.	Disapp.	27	21	47	
III. Shadow	Egress	19	20	57		II. Eclipse	Reapp.	28	1	19	11.0
I. Occult.	Disapp. W.	20	11	11		I. Transit	Ingress W.	28	10	14	
I. Eclipse	Reapp. W.	20	13	36	46.2	I. Shadow	Ingress W.	28	10	34	
II. Occult.	Disapp.	20	19	32		I. Transit	Egress W.	28	12	34	
II. Eclipse	Reapp.	20	22	42	55.7	I. Shadow	Egress W.	28	12	54	
I. Transit	Ingress W.	21	8	30		I. Occult.	Disapp. W.	29	7	21	
I. Shadow	Ingress W.	21	8	39		I. Eclipse	Reapp. W.	29	9	59	50.5
I. Transit	Egress W.	21	10	50		II. Transit	Ingress W.	29	15	51	
I. Shadow	Egress W.	21	10	59		II. Shadow	Ingress W.	29	16	35	
I. Occult.	Disapp. W.	22	5	37		II. Transit	Egress	29	18	45	
I. Eclipse	Reapp. W.	22	8	5	20.5	II. Shadow	Egress	29	19	30	
II. Transit	Ingress W.	22	13	36		I. Transit	Ingress	30	4	40	
II. Shadow	Ingress W.	22	14	0		I. Shadow	Ingress	30	5	2	
II. Transit	Egress W.	22	16	31		I. Transit	Egress W.	30	7	0	
II. Shadow	Egress W.	22	16	54		I. Shadow	Egress W.	30	7	22	
I. Transit	Ingress	23	2	56		III. Occult.	Disapp. W.	30	9	53	
I. Shadow	Ingress	23	3	8		III. Eclipse	Reapp. W.	30	14	52	34.3
I. Transit	Egress	23	5	16		I. Occult.	Disapp.	31	1	47	
I. Shadow	Egress W.	23	5	28		I. Eclipse	Reapp.	31	4	28	30.5
III. Occult.	Disapp. W.	23	6	37		II. Occult.	Disapp. W.	31	10	54	
III. Eclipse	Reapp. W.	23	10	52	57.4	II. Eclipse	Reapp. W.	31	14	37	2.5
I. Occult.	Disapp.	24	0	3		I. Transit	Ingress	31	23	6	
I. Eclipse	Disapp.	24	2	33	58.0	I. Shadow	Ingress	31	23	31	

# 454 JUPITER'S SATELLITES, 1872.

WASHINGTON MEAN TIME.

JANUARY.

Phases of the Eclipses of the Satellites for an Inverting Telescope.



FEBRUARY.

			d	h	m	s				d	h	m	s
I.	Transit	Egress	1	1	26		II.	Shadow	Egress	5	22	6	
I.	Shadow	Egress	1	1	51		I.	Transit	Ingress W.	6	6	26	
IV.	Transit	Ingress W.	1	10	30		I.	Shadow	Ingress W.	6	6	57	
IV.	Shadow	Ingress W.	1	14	38		I.	Transit	Egress W.	6	8	44	
IV.	Transit	Egress W.	1	14	40		I.	Shadow	Egress W.	6	9	17	
IV.	Shadow	Egress	1	18	48		III.	Occult.	Disapp. W.	6	13	12	
I.	Occult.	Disapp.	1	20	13		III.	Eclipse	Reapp.	6	18	52	53.7
I.	Eclipse	Reapp.	1	22	57	7.5	I.	Occult.	Disapp.	7	3	32	
II.	Transit	Ingress	2	4	58		I.	Eclipse	Reapp. W.	7	6	23	12.1
II.	Shadow	Ingress W.	2	5	53		II.	Occult.	Disapp. W.	7	13	11	
II.	Transit	Egress W.	2	7	53		II.	Eclipse	Reapp.	7	17	13	15.7
II.	Shadow	Egress W.	2	8	48		I.	Transit	Ingress	8	0	52	
I.	Transit	Ingress	2	17	33		I.	Shadow	Ingress	8	1	26	
I.	Shadow	Ingress	2	18	0		I.	Transit	Egress	8	3	11	
I.	Transit	Egress	2	19	52		I.	Shadow	Egress	8	3	46	
I.	Shadow	Egress	2	20	20		I.	Occult.	Disapp.	8	21	58	
III.	Transit	Ingress	2	23	33		I.	Eclipse	Reapp.	9	0	51	51.2
III.	Shadow	Ingress	3	1	38		II.	Transit	Ingress W.	9	7	15	
III.	Transit	Egress	3	3	2		II.	Shadow	Ingress W.	9	8	29	
III.	Shadow	Egress	3	4	58		II.	Transit	Egress W.	9	10	9	
I.	Occult.	Disapp. W.	3	14	40		II.	Shadow	Egress W.	9	11	24	
I.	Eclipse	Reapp. W.	3	17	25	50.8	IV.	Occult.	Disapp.	9	18	34	
II.	Occult.	Disapp.	4	0	3		I.	Transit	Ingress	9	19	18	
II.	Eclipse	Reapp.	4	3	55	23.4	I.	Shadow	Ingress	9	19	54	
I.	Transit	Ingress W.	4	12	0		I.	Transit	Egress	9	21	37	
I.	Shadow	Ingress W.	4	12	28		I.	Shadow	Egress	9	22	14	
I.	Transit	Egress W.	4	14	18		IV.	Occult.	Reapp.	9	22	44	
I.	Shadow	Egress W.	4	14	48		IV.	Eclipse	Disapp.	10	0	35	51.3
I.	Occult.	Disapp. W.	5	9	6		III.	Transit	Ingress	10	2	53	
I.	Eclipse	Reapp. W.	5	11	54	29.5	IV.	Eclipse	Reapp.	10	4	42	10.7
II.	Transit	Ingress	5	18	6		III.	Shadow	Ingress	10	5	27	
II.	Shadow	Ingress	5	19	11		III.	Transit	Egress W.	10	6	22	
II.	Transit	Egress	5	21	1		III.	Shadow	Egress W.	10	8	57	

# JUPITER'S SATELLITES, 1872. 455

## WASHINGTON MEAN TIME.

### FEBRUARY.

		<sup>d</sup>	<sup>h</sup>	<sup>m</sup>	<sup>s</sup>			<sup>d</sup>	<sup>h</sup>	<sup>m</sup>	<sup>s</sup>
I. Occult.	Disapp. W.	10	16	25		IV. Shadow	Egress W.	18	12	55	
I. Eclipse	Reapp.	10	19	20	36.7	I. Transit	Ingress W.	18	15	31	
II. Occult.	Disapp.	11	2	20		I. Shadow	Ingress W.	18	16	18	
II. Eclipse	Reapp. W.	11	6	31	32.6	I. Transit	Egress	18	17	50	
I. Transit	Ingress W.	11	13	44		I. Shadow	Egress	18	18	38	
I. Shadow	Ingress W.	11	14	23		I. Occult.	Disapp. W.	19	12	37	
I. Transit	Egress W.	11	16	3		I. Eclipse	Reapp. W.	19	15	44	13.3
I. Shadow	Egress W.	11	16	43		II. Transit	Ingress	19	22	43	
I. Occult.	Disapp. W.	12	10	51		II. Shadow	Ingress	20	0	23	
I. Eclipse	Reapp. W.	12	13	49	17.4	II. Transit	Egress	20	1	38	
II. Transit	Ingress	12	20	28		II. Shadow	Egress	20	3	18	
II. Shadow	Ingress	12	21	47		I. Transit	Ingress W.	20	9	57	
II. Transit	Egress	12	23	18		I. Shadow	Ingress W.	20	10	47	
II. Shadow	Egress	13	0	42		I. Transit	Egress W.	20	12	16	
I. Transit	Ingress W.	13	8	11		I. Shadow	Egress W.	20	13	7	
I. Shadow	Ingress W.	13	8	52		III. Occult.	Disapp.	20	20	1	
I. Transit	Egress W.	13	10	30		III. Occult.	Reapp.	20	23	29	
I. Shadow	Egress W.	13	11	12		III. Eclipse	Disapp.	20	23	30	58.0
III. Occult.	Disapp. W.	13	16	34		III. Eclipse	Reapp.	21	2	53	40.2
III. Eclipse	Reapp.	13	22	53	1.5	I. Occult.	Disapp. W.	21	7	4	
I. Occult.	Disapp.	14	5	17		I. Eclipse	Reapp. W.	21	10	13	0.1
I. Eclipse	Reapp. W.	14	8	18	2.1	II. Occult.	Disapp.	21	17	49	
II. Occult.	Disapp. W.	14	15	28		II. Eclipse	Reapp.	21	22	25	29.5
II. Eclipse	Reapp.	14	19	49	24.8	I. Transit	Ingress	22	4	24	
I. Transit	Ingress	15	2	37		I. Shadow	Ingress	22	5	16	
I. Shadow	Ingress	15	3	20		I. Transit	Egress W.	22	6	43	
I. Transit	Egress	15	4	56		I. Shadow	Egress W.	22	7	36	
I. Shadow	Egress	15	5	40		I. Occult.	Disapp.	23	1	31	
I. Occult.	Disapp.	15	23	44		I. Eclipse	Reapp.	23	4	41	42.6
I. Eclipse	Reapp.	16	2	46	43.0	II. Transit	Ingress W.	23	11	54	
II. Transit	Ingress W.	16	9	38		II. Shadow	Ingress W.	23	13	41	
II. Shadow	Ingress W.	16	11	5		II. Transit	Egress W.	23	14	49	
II. Transit	Egress W.	16	12	28		II. Shadow	Egress	23	16	37	
II. Shadow	Egress W.	16	14	0		I. Transit	Ingress	23	22	51	
I. Transit	Ingress	16	21	4		I. Shadow	Ingress	23	23	45	
I. Shadow	Ingress	16	21	49		I. Transit	Egress	24	1	10	
I. Transit	Egress	16	23	23		I. Shadow	Egress	24	2	5	
I. Shadow	Egress	17	0	9		III. Transit	Ingress W.	24	9	45	
III. Transit	Ingress W.	17	6	22		III. Transit	Egress W.	24	13	13	
III. Shadow	Ingress W.	17	9	26		III. Shadow	Ingress W.	24	13	25	
III. Transit	Egress W.	17	9	51		III. Shadow	Egress	24	16	57	
III. Shadow	Egress W.	17	12	57		I. Occult.	Disapp.	24	19	58	
I. Occult.	Disapp.	17	18	11		I. Eclipse	Reapp.	24	23	10	32.0
I. Eclipse	Reapp.	17	21	15	30.8	II. Occult.	Disapp. W.	25	7	0	
IV. Transit	Ingress	18	1	10		II. Eclipse	Reapp. W.	25	11	43	37.7
II. Occult.	Disapp.	18	4	38		I. Transit	Ingress	25	17	18	
IV. Transit	Egress	18	5	20		I. Shadow	Ingress	25	18	14	
IV. Shadow	Ingress W.	18	8	39		I. Transit	Egress	25	19	37	
II. Eclipse	Reapp. W.	18	9	7	37.4	I. Shadow	Egress	25	20	33	

# 456 JUPITER'S SATELLITES, 1872.

WASHINGTON MEAN TIME.

## FEBRUARY.

IV. Occult.	Disapp. W.	d	h	m	s	I. Shadow	Egress W.	d	h	m	s
IV. Occult.	Reapp. W.	26	13	47		III. Occult.	Disapp.	27	23	30	
I. Occult.	Disapp. W.	26	14	25		III. Occult.	Reapp.	28	3	0	
I. Eclipse	Reapp.	26	17	39	16.5	III. Eclipse	Disapp.	28	3	30	30.1
IV. Eclipse	Disapp.	26	18	38	39.6	III. Eclipse	Reapp. W.	28	6	53	48.1
IV. Eclipse	Reapp.	26	22	50	6.4	I. Occult.	Disapp. W.	28	8	52	
II. Transit	Ingress	27	1	5		I. Eclipse	Reapp. W.	28	12	8	5.1
II. Shadow	Ingress	27	3	0		II. Occult.	Disapp.	28	20	11	
II. Transit	Egress	27	4	0		II. Eclipse	Reapp.	29	1	1	29.2
II. Shadow	Egress	27	5	55		I. Transit	Ingress W.	29	6	12	
I. Transit	Ingress W.	27	11	45		I. Shadow	Ingress W.	29	7	12	
I. Shadow	Ingress W.	27	12	43		I. Transit	Egress W.	29	8	31	
I. Transit	Egress W.	27	14	4		I. Shadow	Egress W.	29	9	30	

Phases of the Eclipses of the Satellites for an Inverting Telescope.



## MARCH.

I. Occult.	Disapp.	d	h	m	s	I. Shadow	Ingress	d	h	m	s
I. Eclipse	Reapp. W.	1	6	36	49.4	I. Transit	Egress	3	21	25	
II. Transit	Ingress W.	1	14	17		I. Shadow	Egress	3	22	28	
II. Shadow	Ingress	1	16	18		I. Occult.	Disapp.	4	16	14	
II. Transit	Egress	1	17	12		I. Eclipse	Reapp.	4	19	34	26.6
II. Shadow	Egress	1	19	14		II. Transit	Ingress	5	3	30	
I. Transit	Ingress	2	0	39		II. Shadow	Ingress	5	5	37	
I. Shadow	Ingress	2	1	40		II. Transit	Egress W.	5	6	24	
I. Transit	Egress	2	2	58		II. Shadow	Egress W.	5	8	31	
I. Shadow	Egress	2	3	59		I. Transit	Ingress W.	5	13	34	
III. Transit	Ingress W.	2	13	18		I. Shadow	Ingress W.	5	14	38	
III. Transit	Egress	2	16	46		I. Transit	Egress	5	15	53	
III. Shadow	Ingress	2	17	25		IV. Transit	Ingress	5	16	39	
III. Shadow	Egress	2	20	57		I. Shadow	Egress	5	16	57	
I. Occult.	Disapp.	2	21	46		IV. Transit	Egress	5	20	49	
I. Eclipse	Reapp.	3	1	5	40.5	IV. Shadow	Ingress	6	2	40	
II. Occult.	Disapp. W.	3	9	23		III. Occult.	Disapp.	6	3	6	
II. Eclipse	Reapp. W.	3	14	19	32.9	III. Occult.	Reapp. W.	6	6	35	
I. Transit	Ingress	3	19	6		IV. Shadow	Egress W.	6	7	1	

# JUPITER'S SATELLITES, 1872. 457

WASHINGTON MEAN TIME.

MARCH.

		d	h	m	s			d	h	m	s
III. Eclipse	Disapp. W.	6	7	30	0.1	IV. Occult.	Disapp.	14	1	36	
I. Occult.	Disapp. W.	6	10	41		IV. Occult.	Reapp.	14	5	47	
III. Eclipse	Reapp. W.	6	10	53	52.9	II. Eclipse	Reapp.	14	6	13	10.1
I. Eclipse	Reapp. W.	6	14	3	16.9	I. Transit	Ingress W.	14	9	51	
II. Occult.	Disapp.	6	22	35		I. Shadow	Ingress W.	14	11	1	
II. Eclipse	Reapp.	7	3	37	23.3	I. Transit	Egress W.	14	12	11	
I. Transit	Ingress W.	7	8	1		IV. Eclipse	Disapp. W.	14	12	42	33.7
I. Shadow	Ingress W.	7	9	6		I. Shadow	Egress W.	14	13	21	
I. Transit	Egress W.	7	10	20		IV. Eclipse	Reapp.	14	16	58	44.3
I. Shadow	Egress W.	7	11	25		I. Occult.	Disapp. W.	15	6	59	
I. Occult.	Disapp.	8	5	9		I. Eclipse	Reapp. W.	15	10	27	21.1
I. Eclipse	Reapp. W.	8	8	32	2.5	II. Transit	Ingress	15	19	11	
II. Transit	Ingress	8	16	43		II. Shadow	Ingress	15	21	32	
II. Shadow	Ingress	8	18	55		II. Transit	Egress	15	22	6	
II. Transit	Egress	8	19	38		II. Shadow	Egress	16	0	28	
II. Shadow	Egress	8	21	50		I. Transit	Ingress	16	4	19	
I. Transit	Ingress	9	2	29		I. Shadow	Ingress	16	5	30	
I. Shadow	Ingress	9	3	35		I. Transit	Egress W.	16	6	39	
I. Transit	Egress	9	4	48		I. Shadow	Egress W.	16	7	50	
I. Shadow	Egress	9	5	54		III. Transit	Ingress	16	20	38	
III. Transit	Ingress	9	16	55		III. Transit	Egress	17	0	7	
III. Transit	Egress	9	20	24		III. Shadow	Ingress	17	1	25	
III. Shadow	Ingress	9	21	25		I. Occult.	Disapp.	17	1	27	
I. Occult.	Disapp.	9	23	36		I. Eclipse	Reapp.	17	4	56	14.6
III. Shadow	Egress	10	0	57		III. Shadow	Egress	17	4	58	
I. Eclipse	Reapp.	10	3	0	55.0	II. Occult.	Disapp. W.	17	14	15	
II. Occult.	Disapp. W.	10	11	48		II. Eclipse	Reapp.	17	19	31	56.0
II. Eclipse	Reapp.	10	16	55	22.4	I. Transit	Ingress	17	22	47	
I. Transit	Ingress	10	20	56		I. Shadow	Ingress	17	23	58	
I. Shadow	Ingress	10	22	4		I. Transit	Egress	18	1	7	
I. Transit	Egress	10	23	16		I. Shadow	Egress	18	2	18	
I. Shadow	Egress	11	0	23		I. Occult.	Disapp.	18	19	55	
I. Occult.	Disapp.	11	18	4		I. Eclipse	Reapp.	18	23	25	2.9
I. Eclipse	Reapp.	11	21	29	42.3	II. Transit	Ingress W.	19	8	26	
II. Transit	Ingress	12	5	57		II. Shadow	Ingress W.	19	10	50	
II. Shadow	Ingress W.	12	8	13		II. Transit	Egress W.	19	11	21	
II. Transit	Egress W.	12	8	51		II. Shadow	Egress W.	19	13	46	
II. Shadow	Egress W.	12	11	9		I. Transit	Ingress	19	17	15	
I. Transit	Ingress	12	15	24		I. Shadow	Ingress	19	18	27	
I. Shadow	Ingress	12	16	32		I. Transit	Egress	19	19	35	
I. Transit	Egress	12	17	43		I. Shadow	Egress	19	20	47	
I. Shadow	Egress	12	18	52		III. Occult.	Disapp. W.	20	10	31	
III. Occult.	Disapp. W.	13	6	46		III. Occult.	Reapp. W.	20	14	0	
III. Occult.	Reapp. W.	13	10	15		I. Occult.	Disapp. W.	20	14	23	
III. Eclipse	Disapp. W.	13	11	29	31.1	III. Eclipse	Disapp.	20	15	29	13.8
I. Occult.	Disapp. W.	13	12	32		I. Eclipse	Reapp.	20	17	53	25.8
III. Eclipse	Reapp.	13	14	53	57.9	III. Eclipse	Reapp.	20	18	54	13.8
I. Eclipse	Reapp.	13	15	58	34.0	II. Occult.	Disapp.	21	3	30	
II. Occult.	Disapp.	14	1	2		II. Eclipse	Reapp. W.	21	8	48	53.1







## 458 JUPITER'S SATELLITES, 1872.

WASHINGTON MEAN TIME.

**MARCH.**

			d	h	m	s
I. Transit	Ingress W.	21	11	44		
I. Shadow	Ingress W.	21	12	56		
I. Transit	Egress W.	21	14	3		
I. Shadow	Egress	21	15	16		
I. Occult.	Disapp. W.	22	8	51		
IV. Transit	Ingress W.	22	9	7		
I. Eclipse	Reapp. W.	22	12	22	43.1	
IV. Transit	Egress W.	22	13	19		
IV. Shadow	Ingress	22	20	41		
II. Transit	Ingress	22	21	42		
II. Shadow	Ingress	23	0	9		
II. Transit	Egress	23	0	37		
IV. Shadow	Egress	23	1	7		
II. Shadow	Egress	23	3	5		
I. Transit	Ingress	23	6	12		
I. Shadow	Ingress W.	23	7	24		
I. Transit	Egress W.	23	8	31		
I. Shadow	Egress W.	23	9	44		
III. Transit	Ingress	24	0	25		
I. Occult.	Disapp.	24	3	20		
III. Transit	Egress	24	3	54		
III. Shadow	Ingress	24	5	24		
I. Eclipse	Reapp. W.	24	6	51	38.0	
III. Shadow	Egress W.	24	8	58		
II. Occult.	Disapp.	24	16	45		
II. Eclipse	Reapp.	24	22	6	43.3	
I. Transit	Ingress	25	0	40		
I. Shadow	Ingress	25	1	53		
I. Transit	Egress	25	2	59		
I. Shadow	Egress	25	4	13		
I. Occult.	Disapp.	25	21	48		
I. Eclipse	Reapp.	26	1	20	27.1	
II. Transit	Ingress W.	26	10	58		
II. Shadow	Ingress W.	26	13	27		
II. Transit	Egress	26	13	53		
II. Shadow	Egress	26	16	23		
I. Transit	Ingress	26	19	9		
I. Shadow	Ingress	26	20	22		
I. Transit	Egress	26	21	28		
I. Shadow	Egress	26	22	42		
III. Occult.	Disapp.	27	14	21		
I. Occult.	Disapp.	27	16	16		
III. Occult.	Reapp.	27	17	50		
III. Eclipse	Disapp.	27	19	29	34.9	
I. Eclipse	Reapp.	27	19	49	20.8	
III. Eclipse	Reapp.	27	22	55	7.1	
II. Occult.	Disapp.	28	6	1		
II. Eclipse	Reapp. W.	28	11	24	27.7	
I. Transit	Ingress W.	28	13	37		
I. Shadow	Ingress	28	14	50		
I. Transit	Egress	28	15	56		
I. Shadow	Egress	28	17	10		
I. Occult.	Disapp. W.	29	10	45		
I. Eclipse	Reapp.	29	14	18	8.8	
II. Transit	Ingress	30	0	15		
II. Shadow	Ingress	30	2	46		
II. Transit	Egress	30	3	10		
II. Shadow	Egress	30	5	42		
I. Transit	Ingress W.	30	8	5		
I. Shadow	Ingress W.	30	9	19		
I. Transit	Egress W.	30	10	24		
I. Shadow	Egress W.	30	11	39		
IV. Occult.	Disapp.	30	18	37		
IV. Occult.	Reapp.	30	22	49		
III. Transit	Ingress	31	4	16		
I. Occult.	Disapp.	31	5	13		
IV. Eclipse	Disapp.	31	6	46	5.9	
III. Transit	Egress W.	31	7	46		
I. Eclipse	Reapp. W.	31	8	47	4.3	
III. Shadow	Ingress W.	31	9	24		
IV. Eclipse	Reapp. W.	31	11	6	37.3	
III. Shadow	Egress W.	31	12	58		
II. Occult.	Disapp.	31	19	17		

### Phases of the Eclipses of the Satellites for an Inverting Telescope.

<p>I.</p> 	<p>III.</p> 
<p>II.</p> 	<p>IV.</p> 

# JUPITER'S SATELLITES, 1872. 459

WASHINGTON MEAN TIME.

APRIL.

II.	Eclipse	Reapp.	d	h	m	s	IV.	Transit	Egress	d	h	m	s
I.	Transit	Ingress	1	0	42	13.4	I.	Shadow	Egress W.	8	6	48	
I.	Shadow	Ingress	1	2	34		IV.	Shadow	Ingress	8	8	3	
I.	Transit	Egress	1	3	48		IV.	Shadow	Egress	8	14	43	
I.	Shadow	Egress	1	4	52		I.	Occult.	Disapp.	8	19	13	
I.	Occult.	Disapp.	1	6	8		I.	Eclipse	Reapp.	9	1	36	
I.	Eclipse	Reapp.	1	23	41		II.	Transit	Ingress	9	5	11	22.5
II.	Transit	Ingress	2	3	15	53.9	II.	Shadow	Ingress	9	16	8	
II.	Shadow	Ingress	2	13	32		II.	Transit	Egress	9	18	42	
II.	Transit	Egress	2	16	5		II.	Shadow	Egress	9	19	3	
II.	Shadow	Egress	2	16	27		I.	Transit	Ingress	9	21	38	
I.	Transit	Ingress	2	19	1		I.	Shadow	Ingress	9	22	56	
I.	Shadow	Ingress	2	21	2		I.	Occult.	Disapp.	10	0	12	
I.	Transit	Egress	2	22	17		I.	Transit	Egress	10	1	14	
I.	Shadow	Egress	2	23	20		I.	Shadow	Egress	10	2	31	
I.	Occult.	Disapp.	3	0	37		I.	Occult.	Disapp.	10	20	5	
I.	Eclipse	Reapp.	3	18	10		III.	Occult.	Disapp.	10	22	14	
III.	Occult.	Disapp.	3	18	15		I.	Eclipse	Reapp.	10	23	40	17.4
III.	Occult.	Reapp.	3	21	44		III.	Occult.	Reapp.	11	1	44	
I.	Eclipse	Reapp.	3	21	44	48.4	III.	Eclipse	Disapp.	11	3	30	7.1
III.	Eclipse	Disapp.	3	23	29	38.5	III.	Eclipse	Reapp.	11	6	56	40.9
III.	Eclipse	Reapp.	4	2	55	41.9	II.	Occult.	Disapp. W.	11	11	8	
II.	Occult.	Disapp. W.	4	8	33		II.	Eclipse	Reapp.	11	16	35	16.0
II.	Eclipse	Reapp.	4	13	59	55.5	I.	Transit	Ingress	11	17	25	
I.	Transit	Ingress	4	15	30		I.	Shadow	Ingress	11	18	41	
I.	Shadow	Ingress	4	16	46		I.	Transit	Egress	11	19	43	
I.	Transit	Egress	4	17	48		I.	Shadow	Egress	11	21	0	
I.	Shadow	Egress	4	19	6		I.	Occult.	Disapp.	12	14	34	
I.	Occult.	Disapp. W.	5	12	39		I.	Eclipse	Reapp.	12	18	9	7.1
I.	Eclipse	Reapp.	5	16	13	36.6	II.	Transit	Ingress	13	5	27	
II.	Transit	Ingress	6	2	50		II.	Shadow	Ingress W.	13	8	1	
II.	Shadow	Ingress	6	5	24		II.	Transit	Egress W.	13	8	22	
II.	Transit	Egress	6	5	45		II.	Shadow	Egress W.	13	10	57	
II.	Shadow	Egress W.	6	8	20		I.	Transit	Ingress W.	13	11	53	
I.	Transit	Ingress W.	6	9	59		I.	Shadow	Ingress	13	13	10	
I.	Shadow	Ingress W.	6	11	15		I.	Transit	Egress	13	14	12	
I.	Transit	Egress W.	6	12	17		I.	Shadow	Egress	13	15	29	
I.	Shadow	Egress	6	13	35		I.	Occult.	Disapp. W.	14	9	3	
I.	Occult.	Disapp. W.	7	7	7		III.	Transit	Ingress	14	12	12	
III.	Transit	Ingress W.	7	8	12		I.	Eclipse	Reapp.	14	12	38	2.2
I.	Eclipse	Reapp. W.	7	10	42	32.5	III.	Transit	Egress	14	15	42	
III.	Transit	Egress W.	7	11	41		III.	Shadow	Ingress	14	17	22	
III.	Shadow	Ingress	7	13	23		III.	Shadow	Egress	14	20	58	
III.	Shadow	Egress	7	16	58		II.	Occult.	Disapp.	15	0	26	
II.	Occult.	Disapp.	7	21	50		II.	Eclipse	Reapp.	15	5	52	55.4
IV.	Transit	Ingress	8	2	35		I.	Transit	Ingress	15	6	22	
II.	Eclipse	Reapp.	8	3	17	39.0	I.	Shadow	Ingress W.	15	7	38	
I.	Transit	Ingress	8	4	27		I.	Transit	Egress W.	15	8	41	
I.	Shadow	Ingress	8	5	43		I.	Shadow	Egress W.	15	9	58	
I.	Transit	Egress	8	6	45		I.	Occult.	Disapp.	16	3	32	

# 460 JUPITER'S SATELLITES, 1872.

## WASHINGTON MEAN TIME.

### APRIL.

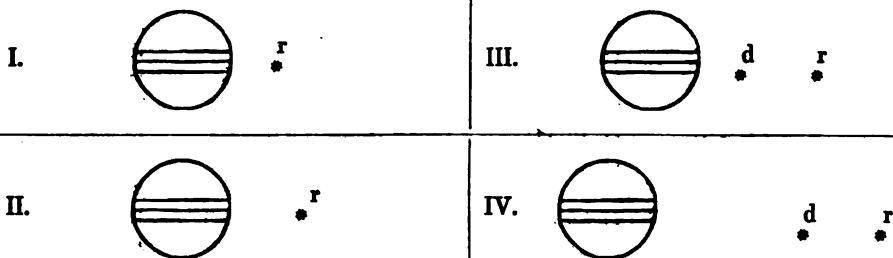
		d	h	m	s			d	h	m	s
I. Eclipse	Reapp.	16	7	6	52.3	II. Transit	Ingress	23	21	27	
IV. Occult.	Disapp.	16	12	34		II. Shadow	Ingress	23	23	57	
IV. Occult.	Reapp.	16	16	48		II. Transit	Egress	24	0	22	
II. Transit	Ingress	16	18	47		I. Transit	Ingress	24	2	47	
II. Shadow	Ingress	16	21	20		II. Shadow	Egress	24	2	53	
II. Transit	Egress	16	21	42		I. Shadow	Ingress	24	4	2	
II. Shadow	Egress	17	0	16		I. Transit	Egress	24	5	6	
IV. Eclipse	Disapp.	17	0	49	37.4	I. Shadow	Egress	24	6	22	
I. Transit	Ingress	17	0	51		IV. Transit	Ingress	24	20	53	
I. Shadow	Ingress	17	2	7		I. Occult.	Disapp.	24	23	58	
I. Transit	Egress	17	3	10		IV. Transit	Egress	25	1	8	
I. Shadow	Egress	17	4	27		I. Eclipse	Reapp.	25	3	31	17.9
IV. Eclipse	Reapp.	17	5	14	7.4	III. Occult.	Disapp.	25	6	22	
I. Occult.	Disapp.	17	22	1		IV. Shadow	Ingress W.	25	8	44	
I. Eclipse	Reapp.	18	1	35	47.6	III. Occult.	Reapp. W.	25	9	53	
III. Occult.	Disapp.	18	2	16		III. Eclipse	Disapp. W.	25	11	29	42.8
III. Occult.	Reapp.	18	5	46		IV. Shadow	Egress	25	13	18	
III. Eclipse	Disapp. W.	18	7	29	59.0	III. Eclipse	Reapp.	25	14	57	14.4
III. Eclipse	Reapp. W.	18	10	57	2.2	II. Occult.	Disapp.	25	16	23	
II. Occult.	Disapp.	18	13	45		I. Transit	Ingress	25	21	16	
II. Eclipse	Reapp.	18	19	10	29.8	II. Eclipse	Reapp.	25	21	45	36.7
I. Transit	Ingress	18	19	20		I. Shadow	Ingress	25	22	31	
I. Shadow	Ingress	18	20	35		I. Transit	Egress	25	23	35	
I. Transit	Egress	18	21	39		I. Shadow	Egress	26	0	51	
I. Shadow	Egress	18	22	56		I. Occult.	Disapp.	26	18	27	
I. Occult.	Disapp.	19	16	30		I. Eclipse	Reapp.	26	22	0	6.5
I. Eclipse	Reapp.	19	20	4	36.1	II. Transit	Ingress W.	27	10	48	
II. Transit	Ingress W.	20	8	7		II. Shadow	Ingress	27	13	17	
II. Shadow	Ingress W.	20	10	39		II. Transit	Egress	27	13	44	
II. Transit	Egress W.	20	11	2		I. Transit	Ingress	27	15	45	
II. Shadow	Egress	20	13	35		II. Shadow	Egress	27	16	13	
I. Transit	Ingress	20	13	49		I. Shadow	Ingress	27	17	0	
I. Shadow	Ingress	20	15	4		I. Transit	Egress	27	18	4	
I. Transit	Egress	20	16	8		I. Shadow	Egress	27	19	20	
I. Shadow	Egress	20	17	25		I. Occult.	Disapp.	28	13	57	
I. Occult.	Disapp. W.	21	10	59		I. Eclipse	Reapp.	28	16	29	2.2
I. Eclipse	Reapp.	21	14	33	32.2	III. Transit	Ingress	28	20	23	
III. Transit	Ingress	21	16	16		III. Transit	Egress	28	23	54	
III. Transit	Egress	21	19	46		III. Shadow	Ingress	29	1	22	
III. Shadow	Ingress	21	21	22		III. Shadow	Egress	29	4	58	
III. Shadow	Egress	22	0	58		II. Occult.	Disapp.	29	5	43	
II. Occult.	Disapp.	22	3	4		I. Transit	Ingress W.	29	10	14	
I. Transit	Ingress W.	22	8	18		II. Eclipse	Reapp. W.	29	11	3	6.4
II. Eclipse	Reapp. W.	22	8	28	3.3	I. Shadow	Ingress W.	29	11	28	
I. Shadow	Ingress W.	22	9	33		I. Transit	Egress	29	12	33	
I. Transit	Egress W.	22	10	37		I. Shadow	Egress	29	13	49	
I. Shadow	Egress W.	22	11	53		I. Occult.	Disapp.	30	7	26	
I. Occult.	Disapp.	23	5	29		I. Occult.	Reapp. W.	30	10	57	52.2
I. Eclipse	Reapp. W.	23	9	2	22.5						

# JUPITER'S SATELLITES, 1872. 461

WASHINGTON MEAN TIME.

APRIL.

Phases of the Eclipses of the Satellites for an Inverting Telescope.



MAY.

		d	h	m	s			d	h	m	s
II.	Transit	Ingress	1	0	9		I.	Shadow	Egress	4	21.15
II.	Shadow	Ingress	1	2	35		I.	Occult.	Disapp.	5	14 55
II.	Transit	Egress	1	3	4		I.	Eclipse	Reapp.	5	18 24 31.1
I.	Transit	Ingress	1	4	43		III.	Transit	Ingress	6	0 34
II.	Shadow	Egress	1	5	31		III.	Transit	Egress	6	4 6
I.	Shadow	Ingress	1	5	57		III.	Shadow	Ingress	6	5 22
I.	Transit	Egress	1	7	3		II.	Occult.	Disapp. W.	6	8 24
I.	Shadow	Egress W.	1	8	18		III.	Shadow	Egress W.	6	8 58
I.	Occult.	Disapp.	2	1	55		I.	Transit	Ingress	6	12 11
I.	Eclipse	Reapp.	2	5	26 47.4		I.	Shadow	Ingress	6	13 23
III.	Occult.	Disapp. W.	2	10	31		II.	Eclipse	Reapp.	6	13 38 2.7
III.	Occult.	Reapp.	2	14	2		I.	Transit	Egress	6	14 31
III.	Eclipse	Disapp.	2	15	29 24.0		I.	Shadow	Egress	6	15 44
III.	Eclipse	Reapp.	2	18	57 23.0		I.	Occult.	Disapp. W.	7	9 24
II.	Occult.	Disapp.	2	19	3		I.	Eclipse	Reapp.	7	12 53 20.8
I.	Transit	Ingress	2	23	13		II.	Transit	Ingress	8	2 53
II.	Eclipse	Reapp.	3	0	20 36.2		II.	Shadow	Ingress	8	5 13
I.	Shadow	Ingress	3	0	26		II.	Transit	Egress	8	5 49
I.	Transit	Egress	3	1	32		I.	Transit	Ingress	8	6 41
I.	Shadow	Egress	3	2	46		I.	Shadow	Ingress W.	8	7 52
IV.	Occult.	Disapp.	3	7	19		II.	Shadow	Egress W.	8	8 9
IV.	Occult.	Reapp.	3	11	36		I.	Transit	Egress W.	8	9 1
IV.	Eclipse	Disapp.	3	18	53 39.4		I.	Shadow	Egress W.	8	10 12
I.	Occult.	Disapp.	3	20	25		I.	Occult.	Disapp.	9	3 54
IV.	Eclipse	Reapp.	3	23	21 46.6		I.	Eclipse	Reapp.	9	7 22 15.7
I.	Eclipse	Reapp.	3	23	55 35.4		III.	Occult.	Disapp.	9	14 44
II.	Transit	Ingress	4	13	32		III.	Occult.	Reapp.	9	18 15
II.	Shadow	Ingress	4	15	54		III.	Eclipse	Disapp.	9	19 29 11.9
II.	Transit	Egress	4	16	27		II.	Occult.	Disapp.	9	21 45
I.	Transit	Ingress	4	17	42		III.	Eclipse	Reapp.	9	22 57 37.1
II.	Shadow	Egress	4	18	51		I.	Transit	Ingress	10	1 10
I.	Shadow	Ingress	4	18	54		I.	Shadow	Ingress	10	2 20
I.	Transit	Egress	4	20	2		II.	Eclipse	Reapp.	10	2 55 29.5

# 462 JUPITER'S SATELLITES, 1872.

## WASHINGTON MEAN TIME.

### MAY.

		d	h	m	s				d	h	m	s
I.	Transit	Egress	10	3	30		I.	Shadow	Egress	17	6	36
I.	Shadow	Egress	10	4	41		I.	Occult.	Disapp.	18	0	23
I.	Occult.	Disapp.	10	22	24		I.	Eclipse	Reapp.	18	3	46 28.4
I.	Eclipse	Reapp.	11	1	51 3.1		II.	Transit	Ingress	18	19	2
IV.	Transit	Ingress	11	15	55		II.	Shadow	Ingress	18	21	10
II.	Transit	Ingress	11	16	16		I.	Transit	Ingress	18	21	39
II.	Shadow	Ingress	11	18	32		II.	Transit	Egress	18	21	57
II.	Transit	Egress	11	19	11		I.	Shadow	Ingress	18	22	44
I.	Transit	Ingress	11	19	40		I.	Shadow	Egress	18	23	59
IV.	Transit	Egress	11	20	14		II.	Shadow	Egress	19	0	6
I.	Shadow	Ingress	11	20	49		I.	Shadow	Egress	19	1	4
II.	Shadow	Egress	11	21	29		I.	Occult.	Disapp.	19	18	53
I.	Transit	Egress	11	22	0		I.	Eclipse	Reapp.	19	22	15 22.6
I.	Shadow	Egress	11	23	10		IV.	Occult.	Disapp.	20	2	44
IV.	Shadow	Ingress	12	2	45		IV.	Occult.	Reapp.	20	7	5
IV.	Shadow	Egress	12	7	23		III.	Transit	Ingress W.	20	9	3
I.	Occult.	Disapp.	12	16	53		III.	Transit	Egress	20	12	35
I.	Eclipse	Reapp.	12	20	19 58.1		IV.	Eclipse	Disapp.	20	12	56 51.4
III.	Transit	Ingress	13	4	47		III.	Shadow	Ingress	20	13	20
III.	Transit	Egress W.	13	8	19		II.	Occult.	Disapp.	20	13	48
III.	Shadow	Ingress W.	13	9	21		I.	Transit	Ingress	20	16	9
II.	Occult.	Disapp.	13	11	6		III.	Shadow	Egress	20	16	58
III.	Shadow	Egress	13	12	58		I.	Shadow	Ingress	20	17	12
I.	Transit	Ingress	13	14	10		IV.	Eclipse	Reapp.	20	17	28 16.0
I.	Shadow	Ingress	13	15	18		I.	Transit	Egress	20	18	29
II.	Eclipse	Reapp.	13	16	12 53.3		II.	Eclipse	Reapp.	20	18	47 38.9
I.	Transit	Egress	13	16	30		I.	Shadow	Egress	20	19	33
I.	Shadow	Egress	13	17	38		I.	Occult.	Disapp.	21	13	23
I.	Occult.	Disapp.	14	11	23		I.	Eclipse	Reapp.	21	16	44 11.1
I.	Eclipse	Reapp.	14	14	48 47.4		II.	Transit	Ingress W.	22	8	24
II.	Transit	Ingress	15	5	39		II.	Shadow	Ingress	22	10	28
II.	Shadow	Ingress	15	7	50		I.	Transit	Ingress	22	10	38
II.	Transit	Egress W.	15	8	34		II.	Transit	Egress	22	11	20
I.	Transit	Ingress W.	15	8	39		I.	Shadow	Ingress	22	11	41
I.	Shadow	Ingress W.	15	9	46		I.	Transit	Egress	22	12	58
II.	Shadow	Egress	15	10	47		II.	Shadow	Egress	22	13	25
I.	Transit	Egress	15	11	0		I.	Shadow	Egress	22	14	2
I.	Shadow	Egress	15	12	7		I.	Occult.	Disapp.	23	7	53
I.	Occult.	Disapp.	16	5	53		I.	Eclipse	Reapp.	23	11	13 4.8
I.	Eclipse	Reapp. W.	16	9	17 41.8		III.	Occult.	Disapp.	23	23	17
III.	Occult.	Disapp.	16	18	59		III.	Occult.	Reapp.	24	2	50
III.	Occult.	Reapp.	16	22	31		II.	Occult.	Disapp.	24	3	10
III.	Eclipse	Disapp.	16	23	29 33.6		III.	Eclipse	Disapp.	24	3	29 31.4
II.	Occult.	Disapp.	17	0	27		I.	Transit	Ingress	24	5	8
III.	Eclipse	Reapp.	17	2	58 24.0		I.	Shadow	Ingress	24	6	10
I.	Transit	Ingress	17	3	9		III.	Eclipse	Reapp.	24	6	58 46.0
I.	Shadow	Ingress	17	4	15		I.	Transit	Egress	24	7	28
I.	Transit	Egress	17	5	30		II.	Eclipse	Reapp.	24	8	4 59.9
II.	Eclipse	Reapp.	17	5	30 17.6		I.	Shadow	Egress W.	24	8	30

W.—Visible at Washington.



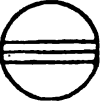

# JUPITER'S SATELLITES, 1872. 463

## WASHINGTON MEAN TIME.

### MAY.

			d	h	m	s				d	h	m	s
I.	Occult.	Disapp.	25	2	23		IV.	Transit	Egress	28	15	57	
I.	Eclipse	Reapp.	25	5	41	50.7	I.	Eclipse	Reapp.	28	18	39	31.8
II.	Transit	Ingress	25	21	48		IV.	Shadow	Ingress	28	20	47	
I.	Transit	Ingress	25	23	38		IV.	Shadow	Egress	29	1	28	
II.	Shadow	Ingress	25	23	48		II.	Transit	Ingress	29	11	11	
I.	Shadow	Ingress	26	0	38		I.	Transit	Ingress	29	12	38	
II.	Transit	Egress	26	0	44		II.	Shadow	Ingress	29	13	6	
I.	Transit	Egress	26	1	58		I.	Shadow	Ingress	29	13	36	
II.	Shadow	Egress	26	2	44		II.	Transit	Egress	29	14	7	
I.	Shadow	Egress	26	2	59		I.	Transit	Egress	29	14	58	
I.	Occult.	Disapp.	26	20	53		I.	Shadow	Egress	29	15	56	
I.	Eclipse	Reapp.	27	0	10	44.3	II.	Shadow	Egress	29	16	2	
III.	Transit	Ingress	27	13	21		I.	Occult.	Disapp. W.	30	9	53	
II.	Occult.	Disapp.	27	16	32		I.	Eclipse	Reapp.	30	13	8	24.8
III.	Transit	Egress	27	16	54		III.	Occult.	Disapp.	31	3	37	
III.	Shadow	Ingress	27	17	19		II.	Occult.	Disapp.	31	5	54	
I.	Transit	Ingress	27	18	8		I.	Transit	Ingress	31	7	8	
I.	Shadow	Ingress	27	19	7		III.	Occult.	Reapp.	31	7	10	
I.	Transit	Egress	27	20	28		III.	Eclipse	Disapp.	31	7	29	47.8
III.	Shadow	Egress	27	20	59		I.	Shadow	Ingress	31	8	4	
II.	Eclipse	Reapp.	27	21	22	18.9	I.	Transit	Egress W.	31	9	28	
I.	Shadow	Egress	27	21	28		I.	Shadow	Egress	31	10	25	
IV.	Transit	Ingress	28	11	32		II.	Eclipse	Reapp.	31	10	39	37.4
I.	Occult.	Disapp.	28	15	23		III.	Eclipse	Reapp.	31	10	59	25.6

### Phases of the Eclipses of the Satellites for an Inverting Telescope.

I.		r		III.		d	r
II.		d		IV.		d	r

### JUNE.

			d	h	m	s				d	h	m	s
I.	Occult.	Disapp.	1	4	23		I.	Occult.	Disapp.	2	22	53	
I.	Eclipse	Reapp.	1	7	37	9.6	I.	Eclipse	Reapp.	3	2	6	2.1
II.	Transit	Ingress	2	0	36		III.	Transit	Ingress	3	17	40	
I.	Transit	Ingress	2	1	38		II.	Occult.	Disapp.	3	19	16	
II.	Shadow	Ingress	2	2	25		I.	Transit	Ingress	3	20	8	
I.	Shadow	Ingress	2	2	33		I.	Shadow	Ingress	3	21	2	
II.	Transit	Egress	2	3	32		III.	Transit	Egress	3	21	14	
I.	Transit	Egress	2	3	58		III.	Shadow	Ingress	3	21	19	
I.	Shadow	Egress	2	4	54		I.	Transit	Egress	3	22	28	
II.	Shadow	Egress	2	5	22		I.	Shadow	Egress	3	23	22	

W.—Visible at Washington.

# 464 JUPITER'S SATELLITES, 1872.

## WASHINGTON MEAN TIME.

### JUNE.

		<sup>d</sup>	<sup>h</sup>	<sup>m</sup>	<sup>s</sup>			<sup>d</sup>	<sup>h</sup>	<sup>m</sup>	<sup>s</sup>	
II. Eclipse	Reapp.	3	23	56	54.8	I. Eclipse	Reapp.	11	22	30	1.1	
III. Shadow	Egress	4	0	57		I. Transit	Ingress	12	16	38		
I. Occult	Disapp	4	17	23		II. Transit	Ingress	12	16	47		
I. Eclipse	Reapp.	4	20	34	48.5	I. Shadow	Ingress	12	17	25		
II. Transit	Ingress	5	13	59		II. Shadow	Ingress	12	18	21		
I. Transit	Ingress	5	14	38		I. Transit	Egress	12	18	58		
I. Shadow	Ingress	5	15	30		II. Transit	Egress	12	19	43		
II. Shadow	Ingress	5	15	43		I. Shadow	Egress	12	19	46		
II. Transit	Egress	5	16	55		II. Shadow	Egress	12	21	17		
I. Transit	Egress	5	16	58		I. Occult.	Disapp.	13	13	54		
I. Shadow	Egress	5	17	51		I. Eclipse	Reapp.	13	16	58	51.9	
II. Shadow	Egress	5	18	40		IV. Transit	Ingress	14	7	34		
IV. Occult.	Disapp.	5	22	36		I. Transit	Ingress	14	11	8		
IV. Occult.	Reapp.	6	3	3		II. Occult.	Disapp.	14	11	25		
IV. Eclipse	Disapp.	6	6	59	44.9	I. Shadow	Ingress	14	11	54		
IV. Eclipse	Reapp.	6	11	34	7.1	IV. Transit	Egress	14	12	4		
I. Occult.	Disapp.	6	11	53		III. Occult	Disapp.	14	12	20		
I. Eclipse	Reapp.	6	15	3	40.7	I. Transit	Egress	14	13	28		
III. Occult.	Disapp.	7	7	58		I. Shadow	Egress	14	14	14		
II. Occult.	Disapp. W.	7	8	39		IV. Shadow	Ingress	14	14	48		
I. Transit	Ingress W.	7	9	8		II. Eclipse	Reapp.	14	15	48	41.7	
I. Shadow	Ingress	7	9	59		III. Eclipse	Reapp.	14	18	59	8.5	
I. Transit	Egress	7	11	28		IV. Shadow	Egress	14	19	31		
I. Shadow	Egress	7	12	20		I. Occult.	Disapp. W.	15	8	24		
II. Eclipse	Reapp.	7	13	14	11.2	I. Eclipse	Reapp.	15	11	27	34.5	
III. Eclipse	Reapp.	7	14	59	23.7	I. Transit	Ingress	16	5	38		
I. Occult.	Disapp.	8	6	23		II. Transit	Ingress	16	6	13		
I. Eclipse	Reapp.	8	9	32	24.4	I. Shadow	Ingress	16	6	22		
II. Transit	Ingress	9	3	24		II. Shadow	Ingress	16	7	40		
I. Transit	Ingress	9	3	38		I. Transit	Egress	16	7	58		
I. Shadow	Ingress	9	4	28		I. Shadow	Egress W.	16	8	43		
II. Shadow	Ingress	9	5	3		II. Transit	Egress	16	9	9		
I. Transit	Egress	9	5	58		II. Shadow	Egress	16	10	39		
II. Transit	Egress	9	6	20		I. Occult	Disapp.	17	2	54		
I. Shadow	Egress	9	6	48		I. Eclipse	Reapp.	17	5	56	24.4	
II. Shadow	Egress	9	8	0		I. Transit	Ingress	18	0	8		
I. Occult.	Disapp.	10	0	53		II. Occult.	Disapp.	18	0	48		
I. Eclipse	Reapp.	10	4	1	15.7	I. Shadow	Ingress	18	0	51		
II. Occult.	Disapp.	10	22	2		III. Transit	Ingress	18	2	25		
III. Transit	Ingress	10	22	2		I. Transit	Egress	18	2	28		
I. Transit	Ingress	10	22	8		I. Shadow	Egress	18	3	12		
I. Shadow	Ingress	10	22	56		II. Eclipse	Reapp.	18	5	5	56.5	
I. Transit	Egress	11	0	28		III. Shadow	Ingress	18	5	17		
I. Shadow	Egress	11	1	17		III. Transit	Egress	18	6	1		
III. Shadow	Ingress	11	1	18		III. Shadow	Egress	18	8	57		
III. Transit	Egress	11	1	37		I. Occult	Disapp.	18	21	25		
II. Eclipse	Reapp.	11	2	31	27.1	I. Eclipse	Reapp.	19	0	25	8.5	
III. Shadow	Egress	11	4	57		I. Transit	Ingress	19	18	38		
I. Occult.	Disapp.	11	19	24		I. Transit	Ingress	19	19	20		

W.—Visible at Washington.





# JUPITER'S SATELLITES, 1872. 465

## WASHINGTON MEAN TIME.

### JUNE.

II. Transit	Ingress	d h m s		I. Shadow	Egress	d h m s	
I. Transit	Egress	19 20 58		III. Transit	Ingress	25 6 50	
II. Shadow	Ingress	19 20 58		II. Eclipse	Reapp.	25 7 40	22.9
I. Shadow	Egress	19 21 40		III. Shadow	Ingress	25 9 19	
II. Transit	Egress	19 22 33		III. Transit	Egress	25 10 27	
II. Shadow	Egress	19 23 55		III. Shadow	Egress	25 12 56	
I. Occult.	Disapp.	20 15 55		I. Occult.	Disapp.	25 23 26	
I. Eclipse	Reapp.	20 18 53	58.1	I. Eclipse	Reapp.	26 2 20	10.8
I. Transit	Ingress	21 13 8		I. Transit	Ingress	26 20 38	
I. Shadow	Ingress	21 13 49		I. Shadow	Ingress	26 21 14	
II. Occult.	Disapp.	21 14 11		II. Transit	Ingress	26 22 27	
I. Transit	Egress	21 15 28		I. Transit	Egress	26 22 59	
I. Shadow	Egress	21 16 9		I. Shadow	Egress	26 23 34	
III. Occult.	Disapp.	21 16 44		II. Shadow	Ingress	26 23 36	
II. Eclipse	Reapp.	21 18 23	9.3	II. Transit	Egress	27 1 23	
III. Eclipse	Reapp.	21 22 58	47.3	II. Shadow	Egress	27 2 32	
I. Occult.	Disapp.	22 10 25		I. Occult.	Disapp.	27 17 56	
I. Eclipse	Reapp.	22 13 22	30.5	I. Eclipse	Reapp.	27 20 48	50.7
IV. Occult.	Disapp.	22 18 51		I. Transit	Ingress	28 15 9	
IV. Occult.	Reapp.	22 23 24		I. Shadow	Ingress	28 15 43	
IV. Eclipse	Disapp.	23 1 2	45.5	II. Occult.	Disapp.	28 16 58	
IV. Eclipse	Reapp.	23 5 39	48.5	I. Transit	Egress	28 17 29	
I. Transit	Ingress	23 7 38		I. Shadow	Egress	28 18 3	
I. Shadow	Ingress W.	23 8 17		II. Eclipse	Reapp.	28 20 57	34.7
II. Transit	Ingress	23 9 2		III. Occult.	Disapp.	28 21 9	
I. Transit	Egress	23 9 58		III. Eclipse	Reapp.	29 2 58	27.3
II. Shadow	Ingress	23 10 18		I. Occult.	Disapp.	29 12 27	
I. Shadow	Egress	23 10 37		I. Eclipse	Reapp.	29 15 17	39.3
II. Transit	Egress	23 11 58		I. Transit	Ingress	30 9 39	
II. Shadow	Egress	23 13 14		I. Shadow	Ingress	30 10 11	
I. Occult.	Disapp.	24 4 56		II. Transit	Ingress	30 11 52	
I. Eclipse	Reapp.	24 7 51	28.0	I. Transit	Egress	30 11 59	
I. Transit	Ingress	25 2 8		I. Shadow	Egress	30 12 31	
I. Shadow	Ingress	25 2 46		II. Shadow	Ingress	30 12 55	
II. Occult.	Disapp.	25 3 35		II. Transit	Egress	30 14 46	
I. Transit	Egress	25 4 29		II. Shadow	Egress	30 15 51	

### Phases of the Eclipses of the Satellites for an Inverting Telescope.

I. 	III. 
II. 	IV. 

The Satellites are not visible from June 30th to September 1st, Jupiter being too near the Sun.

W.—Visible at Washington.



# 466 JUPITER'S SATELLITES, 1872.

WASHINGTON MEAN TIME.

## SEPTEMBER.

		d	h	m	s			d	h	m	s
I. Eclipse	Disapp.	1	6	11	53.6	III. Occult.	Reapp.	8	21	21	
I. Occult.	Reapp.	1	8	59		I. Shadow	Ingress	9	5	11	
III. Eclipse	Disapp.	1	11	18	53.7	I. Transit	Ingress	9	5	48	
III. Occult.	Reapp.	1	16	55		I. Shadow	Egress	9	7	32	
I. Shadow	Ingress	2	3	18		I. Transit	Egress	9	8	8	
I. Transit	Ingress	2	3	48		II. Shadow	Ingress	9	14	57	
I. Shadow	Egress	2	5	38		II. Transit	Ingress W.	9	16	10	
I. Transit	Egress	2	6	8		II. Shadow	Egress	9	17	53	
II. Shadow	Ingress	2	12	22		II. Transit	Egress	9	19	6	
II. Transit	Ingress	2	13	22		I. Eclipse	Disapp.	10	2	34	18.0
II. Shadow	Egress	2	15	18		I. Occult.	Reapp.	10	5	30	
II. Transit	Egress	2	16	18		I. Shadow	Ingress	10	23	40	
I. Eclipse	Disapp.	3	0	40	24.8	I. Transit	Ingress	11	0	18	
I. Occult.	Reapp.	3	3	29		I. Shadow	Egress	11	2	0	
I. Shadow	Ingress	3	21	46		I. Transit	Egress	11	2	38	
I. Transit	Ingress	3	22	18		II. Eclipse	Disapp.	11	9	8	34.0
I. Shadow	Egress	4	0	6		II. Occult.	Reapp.	11	13	19	
I. Transit	Egress	4	0	38		I. Eclipse	Disapp.	11	21	2	43.5
II. Eclipse	Disapp.	4	6	33	57.9	I. Occult.	Reapp.	12	0	0	
II. Occult.	Reapp.	4	10	31		III. Shadow	Ingress	12	5	1	
I. Eclipse	Disapp.	4	19	8	51.7	III. Transit	Ingress	12	7	38	
I. Occult.	Reapp.	4	21	59		III. Shadow	Egress	12	8	43	
III. Shadow	Ingress	5	1	2		III. Transit	Egress	12	11	21	
III. Transit	Ingress	5	3	15		I. Shadow	Ingress	12	18	8	
III. Shadow	Egress	5	4	44		I. Transit	Ingress	12	18	48	
III. Transit	Egress	5	6	57		I. Shadow	Egress	12	20	29	
I. Shadow	Ingress	5	16	14		I. Transit	Egress	12	21	8	
I. Transit	Ingress W.	5	16	48		II. Shadow	Ingress	13	4	14	
I. Shadow	Egress	5	18	35		II. Transit	Ingress	13	5	34	
I. Transit	Egress	5	19	8		II. Shadow	Egress	13	7	10	
II. Shadow	Ingress	6	1	39		II. Transit	Egress	13	8	30	
II. Transit	Ingress	6	2	46		I. Eclipse	Disapp.	13	15	31	13.7
II. Shadow	Egress	6	4	35		I. Occult.	Reapp.	13	18	30	
II. Transit	Egress	6	5	42		I. Shadow	Ingress	14	12	36	
IV. Shadow	Ingress	6	8	46		I. Transit	Ingress	14	13	18	
I. Eclipse	Disapp.	6	13	37	23.7	I. Shadow	Egress	14	14	57	
IV. Shadow	Egress	6	13	39		I. Transit	Egress	14	15	38	
IV. Transit	Ingress	6	14	10		IV. Eclipse	Disapp.	14	19	8	10.5
I. Occult.	Reapp. W.	6	16	30		II. Eclipse	Disapp.	14	22	26	4.4
IV. Transit	Egress	6	19	6		IV. Eclipse	Reapp.	14	23	53	35.5
I. Shadow	Ingress	7	10	43		IV. Occult.	Disapp.	15	1	41	
I. Transit	Ingress	7	11	18		II. Occult.	Reapp.	15	2	43	
I. Shadow	Egress	7	13	3		IV. Occult.	Reapp.	15	6	36	
I. Transit	Egress	7	13	38		I. Eclipse	Disapp.	15	9	59	37.6
II. Eclipse	Disapp.	7	19	51	24.1	I. Occult.	Reapp.	15	13	0	
II. Occult.	Reapp.	7	23	56		III. Eclipse	Disapp.	15	19	15	50.2
I. Eclipse	Disapp.	8	8	5	48.8	III. Occult.	Reapp.	16	1	45	
I. Occult.	Reapp.	8	11	0		I. Shadow	Ingress	16	7	5	
III. Eclipse	Disapp.	8	15	17	42.5	I. Transit	Ingress	16	7	48	

W.—Visible at Washington.

# JUPITER'S SATELLITES, 1872. 467

## WASHINGTON MEAN TIME.

### SEPTEMBER.

			d	h	m	s				d	h	m	s
I.	Shadow	Egress	16	9	25		IV.	Transit	Egress W.	23	15	20	
I.	Transit	Egress	16	10	8		II.	Shadow	Ingress	23	20	6	
II.	Shadow	Ingress	16	17	32		II.	Transit	Ingress	23	21	45	
II.	Transit	Ingress	16	18	58		II.	Shadow	Egress	23	23	2	
II.	Shadow	Egress	16	20	28		II.	Transit	Egress	24	0	40	
II.	Transit	Egress	16	21	54		I.	Eclipse	Disapp.	24	6	21	45.0
I.	Eclipse	Disapp.	17	4	28	4.8	I.	Occult.	Reapp.	24	9	29	
I.	Occult.	Reapp.	17	7	30		I.	Shadow	Ingress	25	3	27	
I.	Shadow	Ingress	18	1	33		I.	Transit	Ingress	25	4	17	
I.	Transit	Ingress	18	2	18		I.	Shadow	Egress	25	5	47	
I.	Shadow	Egress	18	3	54		I.	Transit	Egress	25	6	37	
I.	Transit	Egress	18	4	38		II.	Eclipse	Disapp.	25	14	18	1.1
II.	Eclipse	Disapp.	18	11	43	14.9	II.	Occult.	Reapp.	25	18	52	
II.	Occult.	Reapp. W.	18	16	6		I.	Eclipse	Disapp.	26	0	50	7.3
I.	Eclipse	Disapp.	18	22	56	28.8	I.	Occult.	Reapp.	26	3	59	
I.	Occult.	Reapp.	19	1	59		III.	Shadow	Ingress	26	12	58	
III.	Shadow	Ingress	19	8	59		III.	Transit	Ingress W.	26	16	24	
III.	Transit	Ingress	19	12	2		III.	Shadow	Egress W.	26	16	40	
III.	Shadow	Egress	19	12	43		III.	Transit	Egress	26	20	7	
III.	Transit	Egress W.	19	15	45		I.	Shadow	Ingress	26	21	55	
I.	Shadow	Ingress	19	20	2		I.	Transit	Ingress	26	22	47	
I.	Transit	Ingress	19	20	48		I.	Shadow	Egress	27	0	16	
I.	Shadow	Egress	19	22	22		I.	Transit	Egress	27	1	7	
I.	Transit	Egress	19	23	8		II.	Shadow	Ingress	27	9	24	
II.	Shadow	Ingress	20	6	49		II.	Transit	Ingress	27	11	7	
II.	Transit	Ingress	20	8	21		II.	Shadow	Egress	27	12	20	
II.	Shadow	Egress	20	9	45		II.	Transit	Egress	27	14	3	
II.	Transit	Egress	20	11	19		I.	Eclipse	Disapp.	27	19	18	34.2
I.	Eclipse	Disapp.	20	17	24	57.2	I.	Occult.	Reapp.	27	22	29	
I.	Occult.	Reapp.	20	20	29		I.	Shadow	Ingress W.	28	16	24	
I.	Shadow	Ingress	21	14	30		I.	Transit	Ingress W.	28	17	17	
I.	Transit	Ingress	21	15	17		I.	Shadow	Egress	28	18	44	
I.	Shadow	Egress W.	21	16	50		I.	Transit	Egress	28	19	37	
I.	Transit	Egress	21	17	37		II.	Eclipse	Disapp.	29	3	35	41.0
II.	Eclipse	Disapp.	22	1	0	50.5	II.	Occult.	Reapp.	29	8	15	
II.	Occult.	Reapp.	22	5	29		I.	Eclipse	Disapp.	29	13	46	55.0
I.	Eclipse	Disapp.	22	11	53	19.4	I.	Occult.	Reapp.	29	16	58	
I.	Occult.	Reapp.	22	14	59		III.	Eclipse	Disapp.	30	3	11	35.9
III.	Eclipse	Disapp.	22	23	13	43.8	III.	Eclipse	Reapp.	30	6	45	11.3
IV.	Shadow	Ingress	23	2	43		III.	Occult.	Disapp.	30	6	46	
III.	Occult.	Reapp.	23	6	7		III.	Occult.	Reapp.	30	10	28	
IV.	Shadow	Egress	23	7	38		I.	Shadow	Ingress	30	10	52	
I.	Shadow	Ingress	23	8	59		I.	Transit	Ingress	30	11	47	
I.	Transit	Ingress	23	9	49		I.	Shadow	Egress	30	13	13	
IV.	Transit	Ingress	23	10	25		I.	Transit	Egress	30	14	7	
I.	Shadow	Egress	23	11	19		II.	Shadow	Ingress	30	22	41	
I.	Transit	Egress	23	12	7								

W.—Visible at Washington.

468 JUPITER'S SATELLITES, 1872.

WASHINGTON MEAN TIME.													
SEPTEMBER.													
Phases of the Eclipses of the Satellites for an Inverting Telescope.													
I.					III.								
II.					IV.								
OCTOBER.													
II.	Transit	Ingress	d	h	m	s	I.	Shadow	Egress	d	h	m	s
II.	Shadow	Egress	1	0	30		I.	Transit	Egress	5	20	38	
II.	Transit	Egress	1	1	37		II.	Eclipse	Disapp.	6	6	10	37.3
II.	Transit	Egress	1	3	26		II.	Occult.	Reapp.	6	11	1	
I.	Eclipse	Disapp.	1	8	15	18.9	I.	Eclipse	Disapp. W.	6	15	40	24.6
I.	Occult.	Reapp.	1	11	28		I.	Occult.	Reapp.	6	18	57	
IV.	Eclipse	Disapp.	1	13	8	16.4	III.	Eclipse	Disapp.	7	7	9	29.5
IV.	Eclipse	Reapp.	1	17	54	26.2	III.	Eclipse	Reapp.	7	10	43	9.9
IV.	Occult.	Disapp.	1	21	50		III.	Occult.	Disapp.	7	11	3	
IV.	Occult.	Reapp.	2	2	45		I.	Shadow	Ingress	7	12	46	
I.	Shadow	Ingress	2	5	20		I.	Transit	Ingress	7	13	45	
I.	Transit	Ingress	2	6	16		III.	Occult.	Reapp. W.	7	14	46	
I.	Shadow	Egress	2	7	41		I.	Shadow	Egress W.	7	15	6	
I.	Transit	Egress	2	8	36		I.	Transit	Egress W.	7	16	5	
II.	Eclipse	Disapp. W.	2	16	52	52.3	II.	Shadow	Ingress	8	1	15	
II.	Occult.	Reapp.	2	21	38		II.	Transit	Ingress	8	3	15	
I.	Eclipse	Disapp.	3	2	43	39.8	II.	Shadow	Egress	8	4	11	
I.	Occult.	Reapp.	3	5	58		II.	Transit	Egress	8	6	10	
III.	Shadow	Ingress W.	3	16	56		I.	Eclipse	Disapp.	8	10	8	46.9
III.	Shadow	Egress	3	20	38		I.	Occult.	Reapp.	8	13	26	
III.	Transit	Ingress	3	20	44		I.	Shadow	Ingress	9	7	14	
I.	Shadow	Ingress	3	23	49		I.	Transit	Ingress	9	8	15	
III.	Transit	Egress	4	0	27		I.	Shadow	Egress	9	9	35	
I.	Transit	Ingress	4	0	46		I.	Transit	Egress	9	10	35	
I.	Shadow	Egress	4	2	10		II.	Eclipse	Disapp.	9	19	27	49.7
I.	Transit	Egress	4	3	6		IV.	Shadow	Ingress	9	20	41	
II.	Shadow	Ingress	4	11	58		II.	Occult.	Reapp.	10	0	23	
II.	Transit	Ingress	4	13	53		IV.	Shadow	Egress	10	1	36	
II.	Shadow	Egress W.	4	14	54		I.	Eclipse	Disapp.	10	4	37	6.3
II.	Transit	Egress W.	4	16	48		IV.	Transit	Ingress	10	6	18	
I.	Eclipse	Disapp.	4	21	12	5.0	I.	Occult.	Reapp.	10	7	56	
I.	Occult.	Reapp.	5	0	27		IV.	Transit	Egress	10	11	14	
I.	Shadow	Ingress	5	18	17		III.	Shadow	Ingress	10	20	54	
I.	Transit	Ingress	5	19	16								

W.—Visible at Washington.

# JUPITER'S SATELLITES, 1872. 469

WASHINGTON MEAN TIME.

OCTOBER.

			d	h	m	s				d	h	m	s
III.	Shadow	Egress	11	0	36			I.	Transit	Egress	18	7	2
III.	Transit	Ingress	11	1	1			IV.	Eclipse	Disapp.	18	7	7 18.3
I.	Shadow	Ingress	11	1	43			III.	Transit	Egress	18	8	59
I.	Transit	Ingress	11	2	44			IV.	Eclipse	Reapp.	18	11	53 54.7
I.	Shadow	Egress	11	4	5			II.	Shadow	Ingress W.	18	17	6
III.	Transit	Egress	11	4	44			IV.	Occult.	Disapp. W.	18	17	31
I.	Transit	Egress	11	5	4			II.	Transit	Ingress	18	19	20
II.	Shadow	Ingress W.	11	14	32			II.	Shadow	Egress	18	20	2
II.	Transit	Ingress W.	11	16	37			II.	Transit	Egress	18	22	15
II.	Shadow	Egress W.	11	17	28			IV.	Occult	Reapp.	18	22	26
II.	Transit	Egress	11	19	32			I.	Eclipse	Disapp.	19	0	58 49.2
I.	Eclipse	Disapp.	11	23	5	29.9		I.	Occult	Reapp.	19	4	23
I.	Occult.	Reapp.	12	2	25			I.	Shadow	Ingress	19	22	5
I.	Shadow	Ingress	12	20	11			I.	Transit	Ingress	19	23	11
I.	Transit	Ingress	12	21	14			I.	Shadow	Egress	20	0	25
I.	Shadow	Egress	12	22	31			I.	Transit	Egress	20	1	31
I.	Transit	Egress	12	23	34			II.	Eclipse	Disapp.	20	11	20 47.1
II.	Eclipse	Disapp.	13	8	45	39.3		II.	Occult.	Reapp. W.	20	16	29
II.	Occult.	Reapp.	13	13	45			I.	Eclipse	Disapp.	20	19	27 6.5
I.	Eclipse	Disapp. W.	13	17	33	48.2		I.	Occult	Reapp.	20	22	52
I.	Occult.	Reapp.	13	20	55			III.	Eclipse	Disapp. W.	21	15	5 50.3
III.	Eclipse	Disapp.	14	11	7	55.0		I.	Shadow	Ingress W.	21	16	33
I.	Shadow	Ingress W.	14	14	40			I.	Transit	Ingress W.	21	17	41
III.	Eclipse	Reapp. W.	14	14	41	39.6		III.	Eclipse	Reapp.	21	18	39 38.1
III.	Occult.	Disapp. W.	14	15	20			I.	Shadow	Egress	21	18	53
I.	Transit	Ingress W.	14	15	43			III.	Occult.	Disapp.	21	19	34
I.	Shadow	Egress W.	14	17	0			I.	Transit	Egress	21	20	1
I.	Transit	Egress	14	18	3			III.	Occult.	Reapp.	21	23	17
III.	Occult.	Reapp.	14	19	3			II.	Shadow	Ingress	22	6	23
II.	Shadow	Ingress	15	3	49			II.	Transit	Ingress	22	8	41
II.	Transit	Ingress	15	5	59			II.	Shadow	Egress	22	9	19
II.	Shadow	Egress	15	6	45			II.	Transit	Egress	22	11	35
II.	Transit	Egress	15	8	54			I.	Eclipse	Disapp. W.	22	13	55 25.8
I.	Eclipse	Disapp.	15	12	2	8.9		I.	Occult	Reapp. W.	22	17	21
I.	Occult.	Reapp. W.	15	15	24			I.	Shadow	Ingress	23	11	1
I.	Shadow	Ingress	16	9	8			I.	Transit	Ingress	23	12	10
I.	Transit	Ingress	16	10	13			I.	Shadow	Egress	23	13	21
I.	Shadow	Egress	16	11	28			I.	Transit	Egress W.	23	14	30
I.	Transit	Egress	16	12	33			II.	Eclipse	Disapp.	24	0	38 1.2
II.	Eclipse	Disapp.	16	22	2	52.4		II.	Occult	Reapp.	24	5	50
II.	Occult.	Reapp.	17	3	7			I.	Eclipse	Disapp.	24	8	22 42.6
I.	Eclipse	Disapp.	17	6	30	27.0		I.	Occult.	Reapp.	24	11	50
I.	Occult.	Reapp.	17	9	53			III.	Shadow	Ingress	25	4	49
III.	Shadow	Ingress	18	0	51			I.	Shadow	Ingress	25	5	30
I.	Shadow	Ingress	18	3	36			I.	Transit	Ingress	25	6	39
III.	Shadow	Egress	18	4	34			I.	Shadow	Egress	25	7	50
I.	Transit	Ingress	18	4	42			III.	Shadow	Egress	25	8	32
III.	Transit	Ingress	18	5	16			I.	Transit	Egress	25	8	59
I.	Shadow	Egress	18	5	56			III.	Transit	Ingress	25	9	28

W.—Visible at Washington.

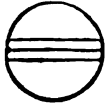
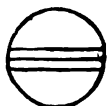
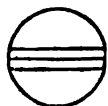

# 470 JUPITER'S SATELLITES, 1872.

WASHINGTON MEAN TIME.

## OCTOBER.

III. Transit	Egress	d	h	m	s		I. Transit	Ingress	d	h	m	s
II. Shadow	Ingress	25	13	11			I. Shadow	Egress	28	19	37	
II. Transit	Ingress	25	22	1			I. Transit	Egress	28	20	47	
II. Shadow	Egress	25	22	36			III. Eclipse	Reapp.	28	22	37	48.8
II. Transit	Egress	26	0	56			III. Occult.	Disapp.	28	23	46	
I. Eclipse	Disapp.	26	2	52	3.3		III. Occult.	Reapp.	29	3	28	
I. Occult.	Reapp.	26	6	19			II. Shadow	Ingress	29	8	57	
IV. Shadow	Ingress W.	26	14	39			II. Transit	Ingress	29	11	21	
IV. Shadow	Egress	26	19	35			II. Shadow	Egress	29	11	53	
I. Shadow	Ingress	26	23	58			II. Transit	Egress W.	29	14	16	
I. Transit	Ingress	27	1	8			I. Eclipse	Disapp. W.	29	15	48	37.8
IV. Transit	Ingress	27	1	41			I. Occult.	Reapp.	29	19	17	
I. Shadow	Egress	27	2	18			I. Shadow	Ingress	30	12	55	
I. Transit	Egress	27	3	28			I. Transit	Ingress W.	30	14	6	
IV. Transit	Egress	27	6	36			I. Shadow	Egress W.	30	15	15	
II. Eclipse	Disapp. W.	27	13	56	0.9		I. Transit	Egress W.	30	16	26	
II. Occult.	Reapp.	27	19	11			II. Eclipse	Disapp.	31	3	13	16.6
I. Eclipse	Disapp.	27	21	20	19.8		II. Occult.	Reapp.	31	8	31	
I. Occult.	Reapp.	28	0	48			I. Eclipse	Disapp.	31	10	16	53.7
I. Shadow	Ingress	28	18	26			I. Occult.	Reapp. W.	31	13	46	
III. Eclipse	Disapp.	28	19	3	58.6							

Phases of the Eclipses of the Satellites for an Inverting Telescope.

I.	d		III.	d	r	
II.	d		IV.	d	r	

## NOVEMBER.

I. Shadow	Ingress	d	h	m	s	II. Transit	Egress	d	h	m	s
I. Transit	Ingress	1	8	35		I. Eclipse	Disapp.	2	4	45	13.3
III. Shadow	Ingress	1	8	47		I. Occult.	Reapp.	2	8	15	
I. Shadow	Egress	1	9	44		I. Shadow	Ingress	3	1	51	
I. Transit	Egress	1	10	55		I. Transit	Ingress	3	3	4	
III. Shadow	Egress	1	12	29		I. Shadow	Egress	3	4	12	
III. Transit	Ingress W.	1	13	38		I. Transit	Egress	3	5	24	
III. Transit	Egress W.	1	17	20		II. Eclipse	Disapp. W.	3	16	31	21.5
II. Shadow	Ingress	1	22	14		II. Occult.	Reapp.	3	21	51	
II. Transit	Ingress	2	0	41		I. Eclipse	Disapp.	3	23	13	29.0
II. Shadow	Egress	2	1	9		IV. Eclipse	Disapp.	4	1	6	3.4

W.—Visible at Washington.

# JUPITER'S SATELLITES, 1872. 471

## WASHINGTON MEAN TIME.

### NOVEMBER.

			d	h	m	s				d	h	m	s
I.	Occult.	Reapp.	4	2	44		I.	Transit	Ingress	11	23	29	
IV.	Eclipse	Reapp.	4	5	52	48.6	I.	Shadow	Egress	12	0	34	
IV.	Occult.	Disapp. W.	4	12	39		I.	Transit	Egress	12	1	49	
IV.	Occult.	Reapp. W.	4	17	32		III.	Eclipse	Disapp.	12	2	58	48.2
I.	Shadow	Ingress	4	20	20		III.	Eclipse	Reapp.	12	6	32	40.4
I.	Transit	Ingress	4	21	33		III.	Occult.	Disapp.	12	7	57	
I.	Shadow	Egress	4	22	41		IV.	Shadow	Ingress	12	8	36	
III.	Eclipse	Disapp.	4	23	1	28.4	III.	Occult.	Reapp.	12	11	39	
I.	Transit	Egress	4	23	53		IV.	Shadow	Egress W.	12	13	32	
III.	Eclipse	Reapp.	5	2	35	20.0	II.	Shadow	Ingress W.	12	14	4	
III.	Occult.	Disapp.	5	3	53		II.	Transit	Ingress W.	12	16	37	
III.	Occult.	Reapp.	5	7	36		II.	Shadow	Egress W.	12	16	59	
II.	Shadow	Ingress	5	11	31		II.	Transit	Egress	12	19	31	
II.	Transit	Ingress W.	5	14	0		I.	Eclipse	Disapp.	12	19	34	50.9
II.	Shadow	Egress W.	5	14	26		IV.	Transit	Ingress	12	20	26	
II.	Transit	Egress W.	5	16	54		I.	Occult.	Reapp.	12	23	7	
I.	Eclipse	Disapp. W.	5	17	41	45.9	IV.	Transit	Egress	13	1	18	
I.	Occult.	Reapp.	5	21	13		I.	Shadow	Ingress W.	13	16	41	
I.	Shadow	Ingress W.	6	14	48		I.	Transit	Ingress W.	13	17	58	
I.	Transit	Ingress W.	6	16	2		I.	Shadow	Egress	13	19	2	
I.	Shadow	Egress W.	6	17	9		I.	Transit	Egress	13	20	18	
I.	Transit	Egress W.	6	18	22		II.	Eclipse	Disapp.	14	8	24	6.8
II.	Eclipse	Disapp.	7	5	48	38.4	II.	Occult.	Reapp. W.	14	13	49	
II.	Occult.	Reapp.	7	11	11		I.	Eclipse	Disapp. W.	14	14	3	5.2
I.	Eclipse	Disapp.	7	12	10	1.1	I.	Occult.	Reapp. W.	14	17	36	
I.	Occult.	Reapp. W.	7	15	41		I.	Shadow	Ingress	15	11	10	
I.	Shadow	Ingress	8	9	16		I.	Transit	Ingress	15	12	26	
I.	Transit	Ingress	8	10	31		I.	Shadow	Egress W.	15	13	31	
I.	Shadow	Egress	8	11	37		I.	Transit	Egress W.	15	14	46	
III.	Shadow	Ingress	8	12	45		III.	Shadow	Ingress W.	15	16	43	
I.	Transit	Egress	8	12	51		III.	Shadow	Egress	15	20	26	
III.	Shadow	Egress W.	8	16	28		III.	Transit	Ingress	15	21	47	
III.	Transit	Ingress W.	8	17	45		III.	Transit	Egress	16	1	29	
III.	Transit	Egress	8	21	27		II.	Shadow	Ingress	16	3	21	
II.	Shadow	Ingress	9	0	48		II.	Transit	Ingress	16	5	55	
II.	Transit	Ingress	9	3	19		II.	Shadow	Egress	16	6	16	
II.	Shadow	Egress	9	3	43		I.	Eclipse	Disapp.	16	8	31	22.8
II.	Transit	Egress	9	6	13		II.	Transit	Egress	16	8	48	
I.	Eclipse	Disapp.	9	6	38	19.6	I.	Occult.	Reapp.	16	12	4	
I.	Occult.	Reapp.	9	10	10		I.	Shadow	Ingress	17	5	38	
I.	Shadow	Ingress	10	3	45		I.	Transit	Ingress	17	6	55	
I.	Transit	Ingress	10	5	0		I.	Shadow	Egress	17	7	59	
I.	Shadow	Egress	10	6	6		I.	Transit	Egress	17	9	15	
I.	Transit	Egress	10	7	20		II.	Eclipse	Disapp.	17	21	42	21.5
II.	Eclipse	Disapp.	10	19	6	48.4	I.	Eclipse	Disapp.	18	2	59	37.6
II.	Occult.	Reapp.	11	0	31		II.	Occult.	Reapp.	18	3	8	
I.	Eclipse	Disapp.	11	1	6	34.7	I.	Occult.	Reapp.	18	6	33	
I.	Occult.	Reapp.	11	4	39		I.	Shadow	Ingress	19	0	7	
I.	Shadow	Ingress	11	22	13		I.	Transit	Ingress	19	1	23	

W.—Visible at Washington.

# 472 JUPITER'S SATELLITES, 1872.

## WASHINGTON MEAN TIME.

### NOVEMBER.

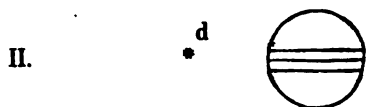
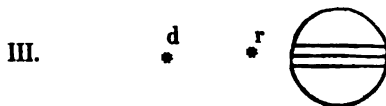
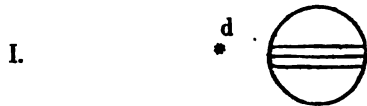
		d	h	m	s			d	h	m	s
I. Shadow	Egress	19	2	27		I. Eclipse	Disapp.	25	4	52	38.4
I. Transit	Egress	19	3	43		II. Occult.	Reapp.	25	5	44	
III. Eclipse	Disapp.	19	6	56	11.5	I. Occult.	Reapp.	25	8	25	
III. Eclipse	Reapp.	19	10	30	3.3	I. Shadow	Ingress	26	2	1	
III. Occult.	Disapp.	19	11	58		I. Transit	Ingress	26	3	16	
III. Occult.	Reapp. W.	19	15	39		I. Shadow	Egress	26	4	21	
II. Shadow	Ingress W.	19	16	37		I. Transit	Egress	26	5	36	
II. Transit	Ingress	19	19	12		III. Eclipse	Disapp.	26	10	53	40.1
II. Shadow	Egress	19	19	33		III. Eclipse	Reapp. W.	26	14	27	30.5
I. Eclipse	Disapp.	19	21	27	53.0	III. Occult.	Disapp. W.	26	15	54	
II. Transit	Egress	19	22	5		II. Shadow	Ingress	26	19	11	
I. Occult.	Reapp.	20	1	1		III. Occult.	Reapp.	26	19	35	
I. Shadow	Ingress W.	20	18	35		II. Transit	Ingress	26	21	45	
IV. Eclipse	Disapp.	20	19	5	16.4	II. Shadow	Egress	26	22	6	
I. Transit	Ingress	20	19	52		I. Eclipse	Disapp.	26	23	20	53.2
I. Shadow	Egress	20	20	56		II. Transit	Egress	27	0	38	
I. Transit	Egress	20	22	12		I. Occult.	Reapp.	27	2	53	
IV. Eclipse	Reapp.	20	23	51	52.6	I. Shadow	Ingress	27	20	29	
IV. Occult.	Disapp.	21	7	3		I. Transit	Ingress	27	21	44	
II. Eclipse	Disapp.	21	10	59	41.2	I. Shadow	Egress	27	22	49	
IV. Occult.	Reapp.	21	11	54		I. Transit	Egress	28	0	4	
I. Eclipse	Disapp. W.	21	15	56	6.9	II. Eclipse	Disapp. W.	28	13	35	22.7
II. Occult.	Reapp. W.	21	16	26		I. Eclipse	Disapp. W.	28	17	49	7.2
I. Occult.	Reapp.	21	19	29		II. Occult.	Reapp.	28	19	0	
I. Shadow	Ingress W.	22	13	4		I. Occult.	Reapp.	28	21	21	
I. Transit	Ingress W.	22	14	20		IV. Shadow	Ingress	29	2	33	
I. Shadow	Egress W.	22	15	24		IV. Shadow	Egress	29	7	29	
I. Transit	Egress W.	22	16	40		IV. Transit	Ingress W.	29	14	21	
III. Shadow	Ingress	22	20	41		I. Shadow	Ingress W.	29	14	57	
III. Shadow	Egress	23	0	24		I. Transit	Ingress W.	29	16	12	
III. Transit	Ingress	23	1	46		I. Shadow	Egress W.	29	17	17	
III. Transit	Egress	23	5	28		I. Transit	Egress W.	29	18	32	
II. Shadow	Ingress	23	5	54		IV. Transit	Egress	29	19	10	
II. Transit	Ingress	23	8	28		III. Shadow	Ingress	30	0	39	
II. Shadow	Egress	23	8	49		III. Shadow	Egress	30	4	22	
I. Eclipse	Disapp.	23	10	24	23.8	III. Transit	Ingress	30	5	39	
II. Transit	Egress	23	11	22		II. Shadow	Ingress	30	8	27	
I. Occult.	Reapp. W.	23	13	57		III. Transit	Egress	30	9	22	
I. Shadow	Ingress	24	7	32		II. Transit	Ingress	30	10	59	
I. Transit	Ingress	24	8	48		II. Shadow	Egress	30	11	22	
I. Shadow	Egress	24	9	52		I. Eclipse	Disapp. W.	30	12	17	23.7
I. Transit	Egress	24	11	8		II. Transit	Egress W.	30	13	52	
II. Eclipse	Disapp.	25	0	18	1.0	I. Occult.	Reapp. W.	30	15	49	

# JUPITER'S SATELLITES, 1872. 473

WASHINGTON MEAN TIME.

NOVEMBER.

Phases of the Eclipses of the Satellites for an Inverting Telescope.



DECEMBER.

		d	h	m	s			d	h	m	s
I. Shadow	Ingress	1	9	26		I. Transit	Egress	6	20	24	
I. Transit	Ingress	1	10	40		III. Shadow	Ingress	7	4	36	
I. Shadow	Egress W.	1	11	46		III. Shadow	Egress	7	8	19	
I. Transit	Egress W.	1	13	0		III. Transit	Ingress	7	9	30	
II. Eclipse	Disapp.	2	2	53	47.0	II. Shadow	Ingress	7	11	0	
I. Eclipse	Disapp.	2	6	45	38.4	IV. Eclipse	Disapp. W.	7	13	3	46.0
II. Occult.	Reapp.	2	8	17		III. Transit	Egress W.	7	13	11	
I. Occult.	Reapp.	2	10	17		II. Transit	Ingress W.	7	13	29	
I. Shadow	Ingress	3	3	54		II. Shadow	Egress W.	7	13	55	
I. Transit	Ingress	3	5	8		I. Eclipse	Disapp. W.	7	14	10	23.1
I. Shadow	Egress	3	6	14		II. Transit	Egress W.	7	16	23	
I. Transit	Egress	3	7	28		I. Occult.	Reapp. W.	7	17	40	
III. Eclipse	Disapp. W.	3	14	51	46.1	IV. Eclipse	Reapp. W.	7	17	49	56.0
III. Eclipse	Reapp. W.	3	18	25	34.3	IV. Occult.	Disapp.	8	0	32	
III. Occult.	Disapp.	3	19	46		IV. Occult.	Reapp.	8	5	20	
II. Shadow	Ingress	3	21	44		I. Shadow	Ingress W.	8	11	19	
III. Occult.	Reapp.	3	23	27		I. Transit	Ingress W.	8	12	32	
II. Transit	Ingress	4	0	15		I. Shadow	Egress W.	8	13	39	
II. Shadow	Egress	4	0	39		I. Transit	Egress W.	8	14	52	
I. Eclipse	Disapp.	4	1	13	52.9	II. Eclipse	Disapp.	9	5	29	39.2
II. Transit	Egress	4	3	8		I. Eclipse	Disapp.	9	8	38	38.1
I. Occult.	Reapp.	4	4	45		II. Occult.	Reapp.	9	10	49	
I. Shadow	Ingress	4	22	22		I. Occult.	Reapp. W.	9	12	8	
I. Transit	Ingress	4	23	36		I. Shadow	Ingress	10	5	47	
I. Shadow	Egress	5	0	42		I. Transit	Ingress	10	7	0	
I. Transit	Egress	5	1	56		I. Shadow	Egress	10	8	8	
II. Eclipse	Disapp. W.	5	16	11	10.8	I. Transit	Egress	10	9	20	
I. Eclipse	Disapp.	5	19	42	6.7	III. Eclipse	Disapp.	10	18	49	25.2
II. Occult.	Reapp.	5	21	33		III. Eclipse	Reapp.	10	22	23	10.4
I. Occult.	Reapp.	5	23	13		III. Occult.	Disapp.	10	23	34	
I. Shadow	Ingress W.	6	16	51		II. Shadow	Ingress	11	0	19	
I. Transit	Ingress W.	6	18	4		II. Transit	Ingress	11	2	43	
I. Shadow	Egress	6	19	11		I. Eclipse	Disapp.	11	3	6	52.6

W.—Visible at Washington.



# 474 JUPITER'S SATELLITES, 1872.

WASHINGTON MEAN TIME.

## DECEMBER.

II.	Shadow	Egress	d	h	m	s		III.	Occult.	Reapp.	d	h	m	s
III.	Occult.	Reapp.	11	3	15			II.	Transit	Egress	18	8	2	
II.	Transit	Egress	11	5	36			I.	Occult.	Reapp.	18	8	25	
I.	Occult.	Reapp.	11	6	35			I.	Shadow	Ingress	19	2	9	
I.	Shadow	Ingress	12	0	16			I.	Transit	Ingress	19	3	18	
I.	Transit	Ingress	12	1	27			I.	Shadow	Egress	19	4	30	
I.	Shadow	Egress	12	2	36			I.	Transit	Egress	19	5	38	
I.	Transit	Egress	12	3	47			II.	Eclipse	Disapp.	19	21	23	6.4
II.	Eclipse	Disapp.	12	18	47	5.2		I.	Eclipse	Disapp.	19	23	28	7.8
I.	Eclipse	Disapp.	12	21	35	6.6		II.	Occult.	Reapp.	20	2	32	
II.	Occult.	Reapp.	13	0	3			I.	Occult.	Reapp.	20	2	52	
I.	Occult.	Reapp.	13	1	3			I.	Shadow	Ingress	20	20	38	
I.	Shadow	Ingress	13	18	44			I.	Transit	Ingress	20	21	45	
I.	Transit	Ingress	13	19	55			I.	Shadow	Egress	20	22	58	
I.	Shadow	Egress	13	21	5			I.	Transit	Egress	21	0	5	
I.	Transit	Egress	13	22	15			III.	Shadow	Ingress W.	21	12	32	
III.	Shadow	Ingress	14	8	34			II.	Shadow	Ingress W.	21	16	7	
III.	Shadow	Egress W.	14	12	17			III.	Shadow	Egress W.	21	16	15	
III.	Transit	Ingress W.	14	13	16			III.	Transit	Ingress W.	21	16	56	
II.	Shadow	Ingress W.	14	13	34			I.	Eclipse	Disapp. W.	21	17	56	24.5
II.	Transit	Ingress W.	14	15	57			II.	Transit	Ingress W.	21	18	22	
I.	Eclipse	Disapp. W.	14	16	3	23.1		II.	Shadow	Egress	21	19	1	
II.	Shadow	Egress W.	14	16	29			III.	Transit	Egress	21	20	37	
III.	Transit	Egress W.	14	16	56			II.	Transit	Egress	21	21	14	
II.	Transit	Egress	14	18	50			I.	Occult.	Reapp.	21	21	19	
I.	Occult.	Reapp.	14	19	30			I.	Shadow	Ingress W.	22	15	6	
I.	Shadow	Ingress W.	15	13	12			I.	Transit	Ingress W.	22	16	13	
I.	Transit	Ingress W.	15	14	23			I.	Shadow	Egress W.	22	17	27	
I.	Shadow	Egress W.	15	15	33			I.	Transit	Egress W.	22	18	32	
I.	Transit	Egress W.	15	16	43			II.	Eclipse	Disapp. W.	23	10	41	42.6
IV.	Shadow	Ingress	15	20	31			I.	Eclipse	Disapp. W.	23	12	24	40.6
IV.	Shadow	Egress	16	1	26			II.	Occult.	Reapp. W.	23	15	45	
IV.	Transit	Ingress	16	7	20			I.	Occult.	Reapp. W.	23	15	46	
II.	Eclipse	Disapp.	16	8	5	37.9		IV.	Eclipse	Disapp.	24	7	2	22.0
I.	Eclipse	Disapp.	16	10	31	38.3		I.	Shadow	Ingress	24	9	35	
IV.	Transit	Egress W.	16	12	7			I.	Transit	Ingress W.	24	10	39	
II.	Occult.	Reapp. W.	16	13	18			IV.	Eclipse	Reapp. W.	24	11	47	48.0
I.	Occult.	Reapp. W.	16	13	57			I.	Shadow	Egress W.	24	11	55	
I.	Shadow	Ingress	17	7	41			I.	Transit	Egress W.	24	12	59	
I.	Transit	Ingress	17	8	50			IV.	Occult.	Disapp. W.	24	17	3	
I.	Shadow	Egress	17	10	2			IV.	Occult.	Reapp.	24	21	48	
I.	Transit	Egress W.	17	11	10			III.	Eclipse	Disapp.	25	2	44	46.3
III.	Eclipse	Disapp.	17	22	47	21.5		II.	Shadow	Ingress	25	5	23	
III.	Eclipse	Reapp.	18	2	21	2.9		III.	Eclipse	Reapp.	25	6	18	22.9
II.	Shadow	Ingress	18	2	50			I.	Eclipse	Disapp.	25	6	52	56.1
III.	Occult.	Disapp.	18	3	17			III.	Occult.	Disapp.	25	6	55	
I.	Eclipse	Disapp.	18	4	59	53.2		II.	Transit	Ingress	25	7	33	
II.	Transit	Ingress	18	5	10			II.	Shadow	Egress	25	8	18	
II.	Shadow	Egress	18	5	45			I.	Occult.	Reapp. W.	25	10	13	

W.—Visible at Washington.

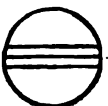
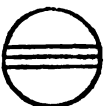


JUPITER'S SATELLITES, 1872. 475

WASHINGTON MEAN TIME.

DECEMBER.

II. Transit	Egress W.	<sup>d</sup> 25 <sup>h</sup> 10 <sup>m</sup> 25		III. Transit	Ingress	<sup>d</sup> 28 <sup>h</sup> 20 <sup>m</sup> 33	
III. Occult.	Reapp. W.	25 10 35		II. Transit	Ingress	28 20 43	
I. Shadow	Ingress	26 4 3		II. Shadow	Egress	28 21 34	
I. Transit	Ingress	26 5 6		I. Occult	Reapp.	28 23 7	
I. Shadow	Egress	26 6 23		II. Transit	Egress	28 23 36	
I. Transit	Egress	26 7 26		III. Transit	Egress	29 0 13	
II. Eclipse	Disapp.	26 23 59 13.8		I. Shadow	Ingress W.	29 17 0	
I. Eclipse	Disapp.	27 1 21 11.4		I. Transit	Ingress W.	29 18 0	
I. Occult	Reapp.	27 4 40		I. Shadow	Egress	29 19 20	
II. Occult.	Reapp.	27 4 57		I. Transit	Egress	29 20 20	
I. Shadow	Ingress	27 22 32		II. Eclipse	Disapp. W.	30 13 17 53.5	
I. Transit	Ingress	27 23 33		I. Eclipse	Disapp. W.	30 14 17 45.7	
I. Shadow	Egress	28 0 52		I. Occult.	Reapp. W.	30 17 34	
I. Transit	Egress	28 1 53		II. Occult.	Reapp. W.	30 18 8	
III. Shadow	Ingress W.	28 16 31		I. Shadow	Ingress W.	31 11 29	
II. Shadow	Ingress	28 18 40		I. Transit	Ingress W.	31 12 27	
I. Eclipse	Disapp.	28 19 49 28.7		I. Shadow	Egress W.	31 13 49	
III. Shadow	Egress	28 20 13		I. Transit	Egress W.	31 14 47	

Phases of the Eclipses of the Satellites for an Inverting Telescope.

I.	<sup>d</sup> *		III.	<sup>d</sup> * <sup>r</sup> *	
II.	<sup>d</sup> *		IV.	<sup>d</sup> * <sup>r</sup> *	

# 476 JUPITER'S SATELLITES, 1872.

WASHINGTON MEAN TIME OF GEOCENTRIC SUPERIOR CONJUNCTION.

## SATELLITE I.

Jan.	1	<sup>h</sup> 1 <sup>m</sup> 36.6	Mar.	17	<sup>h</sup> 2 <sup>m</sup> 37.1	June	1	<sup>h</sup> 5 <sup>m</sup> 32.5	Oct.	17	<sup>h</sup> 8 <sup>m</sup> 43.2
	2	20 2.5		18	21 5.0		3	0 2.7		19	3 12.6
	4	14 28.3		20	15 33.1		4	18 32.8		20	21 41.8
	6	8 54.2		22	10 1.1		6	13 2.9		22	16 11.0
	8	3 20.0		24	4 29.4		8	7 33.1		24	10 40.0
	9	21 45.9		25	22 57.6		10	2 3.3		26	5 9.2
	11	16 11.7		27	17 26.0		11	20 33.5		27	23 38.2
	13	10 37.6		29	11 54.3		13	15 3.7		29	18 7.1
	15	5 3.4		31	6 22.8		15	9 33.9		31	12 36.1
	16	23 29.2	April	2	0 51.2		17	4 4.2	Nov.	2	7 5.0
	18	17 54.8		3	19 19.8		18	22 34.5		4	1 33.9
	20	12 20.9		5	13 48.4		20	17 4.8		5	20 2.7
	22	6 46.8		7	8 17.1		22	11 35.1		7	14 31.4
	24	1 12.7		9	2 45.8		24	6 5.5		9	9 0.1
	25	19 38.7		10	21 14.7		26	0 35.8		11	3 28.7
	27	14 4.8		12	15 43.5		27	19 6.8		12	21 57.3
	29	8 30.8		14	10 12.6		29	13 36.7		14	16 25.7
	31	2 56.9		16	4 41.6	Sept.	1	7 48.9		16	10 54.2
Feb.	1	21 23.0		17	23 10.7		3	2 19.1		18	5 22.6
	3	15 49.2		19	17 39.8		4	20 49.2		19	23 50.9
	5	10 15.3		21	12 9.0		6	15 19.4		21	18 19.1
	7	4 41.6		23	6 38.3		8	9 49.4		23	12 47.3
	8	23 7.9		25	1 7.6		10	4 19.5		25	7 15.5
	10	17 34.3		26	19 36.9		11	22 49.4		27	1 43.5
	12	12 0.7		28	14 6.3		13	17 19.5		28	20 11.4
	14	6 27.2		30	8 35.7		15	11 49.4		30	14 39.4
	16	0 53.8	May	2	3 5.2		17	6 19.4	Dec.	2	9 7.2
	17	19 20.5		3	21 34.7		19	0 49.3		4	3 35.0
	19	13 47.2		5	16 4.3		20	19 19.2		5	22 2.7
	21	8 13.9		7	10 34.0		22	13 49.0		7	16 30.4
	23	2 40.7		9	5 3.7		24	8 18.8		9	10 57.9
	24	21 7.8		10	23 33.4		26	2 48.6		11	5 25.4
	25	15 34.7		12	18 3.2		27	21 18.4		12	23 52.8
	28	10 1.8		14	12 33.0		29	15 48.0		14	18 20.1
March	1	4 28.9		16	7 2.9	Oct.	1	10 17.7		16	12 47.5
	2	22 56.2		18	1 32.8		3	4 47.4		18	7 14.7
	4	17 23.6		19	20 2.8		4	23 17.1		20	1 41.9
	6	11 51.0		21	14 32.7		6	17 46.6		21	20 9.1
	8	6 18.5		23	9 2.7		8	12 16.2		23	14 36.1
	10	0 46.1		25	3 32.5		10	6 45.6		25	9 3.1
	11	19 13.7		26	22 2.5		12	1 15.1		27	3 30.0
	13	13 41.5		28	16 32.5		13	19 44.5		28	21 56.9
	15	8 9.2		30	11 2.6		15	14 13.9		30	16 23.8

## SATELLITE II.

Jan.	3	<sup>h</sup> 3 <sup>m</sup> 22.8	Jan.	31	<sup>h</sup> 12 <sup>m</sup> 21.7	Feb.	28	<sup>h</sup> 21 <sup>m</sup> 38.3	Mar.	28	<sup>h</sup> 7 <sup>m</sup> 28.0
	6	16 30.3		4	1 29.9	Mar.	3	10 50.1		31	20 44.2
	10	5 37.1	Feb.	7	14 38.0		7	0 2.4		4	10 0.8
	13	18 44.7		11	3 46.9		10	13 15.4	April	7	23 17.9
	17	7 51.7		14	16 55.9		14	2 29.0		11	12 35.5
	20	20 59.4		18	6 5.9		17	15 42.8		15	1 53.6
	24	10 6.5		21	19 16.1		21	4 57.4		18	15 12.0
	27	23 14.3		25	8 27.1		24	18 12.5		22	4 31.1

# JUPITER'S SATELLITES, 1872. 477

WASHINGTON MEAN TIME OF GEOCENTRIC SUPERIOR CONJUNCTION.

## SATELLITE II.

April 25	<sup>h</sup> 17 <sup>m</sup> 50.7	June 14	<sup>h</sup> 12 <sup>m</sup> 52.7	Oct. 2	<sup>h</sup> 20 <sup>m</sup> 10.5	Nov. 18	<sup>h</sup> 1 <sup>m</sup> 41.6
29	7 10.6	18	2 15.9	6	9 33.5	21	14 59.1
May 2	20 30.8	21	15 39.2	9	22 55.7	25	4 17.2
6	9 51.2	25	5 2.7	13	12 18.2	28	17 33.7
9	23 12.1	28	18 26.3	17	1 39.9	Dec. 2	6 50.7
13	12 33.2	Sept. 4	9 3.3	20	15 1.8	5	20 6.2
17	1 54.6	7	22 27.4	24	4 22.6	9	9 22.2
20	15 16.1	11	11 51.0	27	17 43.9	12	22 36.8
24	4 37.9	15	1 14.7	31	7 4.1	16	11 51.9
27	17 59.9	18	14 37.9	Nov. 3	20 24.7	20	1 5.3
31	7 22.1	22	4 1.4	7	9 44.2	23	14 19.0
June 3	20 44.5	25	17 24.4	10	23 4.1	27	3 30.6
7	10 7.1	29	6 47.8	14	12 22.6	30	16 42.4
10	23 29.8						

## SATELLITE III.

Jan. 1	<sup>h</sup> 22 <sup>m</sup> 35.6	Mar. 20	<sup>h</sup> 12 <sup>m</sup> 15.2	June 7	<sup>h</sup> 9 <sup>m</sup> 44.9	Oct. 21	<sup>h</sup> 21 <sup>m</sup> 25.6
9	1 51.3	27	16 5.4	14	14 7.8	29	1 36.9
16	5 6.0	April 3	19 59.8	21	18 32.3	Nov. 5	5 44.4
23	8 21.1	10	23 58.9	28	22 57.9	12	9 48.1
30	11 37.5	18	4 1.4	Sept. 1	15 4.4	19	13 48.2
Feb. 6	14 56.6	25	8 7.5	8	19 29.8	26	17 44.4
13	18 18.5	May 2	12 16.9	15	23 53.5	Dec. 3	21 36.9
20	21 45.0	9	16 29.3	23	4 15.7	11	1 24.1
28	1 15.5	16	20 45.1	30	8 36.3	18	5 7.0
March 6	4 50.4	24	1 3.1	Oct. 7	12 54.9	25	8 44.7
13	8 30.3	31	5 23.5	14	17 11.8		

## SATELLITE IV.

Jan. 7	<sup>h</sup> 16 <sup>m</sup> 15.2	Mar. 30	<sup>h</sup> 20 <sup>m</sup> 43.9	June 22	<sup>h</sup> 21 <sup>m</sup> 7.6	Nov. 4	<sup>h</sup> 15 <sup>m</sup> 5.5
24	6 17.6	April 16	14 41.2	Sept. 15	4 8.3	21	9 28.3
Feb. 9	20 39.0	May 3	9 27.7	Oct. 2	0 17.5	Dec. 8	2 56.3
26	11 41.4	20	4 54.3	18	19 58.7	24	19 25.5
Mar. 14	3 41.9	June 6	0 49.6				

In the following Tables  $x$  and  $y$  are the rectangular coördinates for each Satellite, referred to the centre of the primary and the major and minor axes of the apparent ellipse described by the Satellite.  $x$  is positive on the *east* side of the planet; negative on the *west* side.  $y$  is positive when *north*; negative when *south*.

$x'$  and  $y'$  are the coördinates which correspond to a constant value of the major axis and maximum value of the minor axis, as seen from the sun at its mean distance.

The factors by which  $x'$  and  $y'$  must be multiplied to obtain the coördinates  $x$  and  $y$  at any time, are given for each Satellite on pages 482-483.

$p$  is the inclination of the minor axis of the apparent ellipse to the circle of declination; reckoned from the *north*,  $+$  towards the *east*.

COORDINATES IN THE MEAN APPARENT ELLIPSE DESCRIBED BY THE  
SATELLITE, AND FOR THE MEAN DISTANCE OF JUPITER  
FROM THE SUN, FOR THE TIME (t) AFTER GEO-  
CENTRIC SUPERIOR CONJUNCTION.

SATELLITE I.

t	x'	y'	t	x'	y'	t	x'	y'
d h m	"	"	d h m	"	"	d h m	"	"
0 0 0	+ 0.0	+ 6.6	0 15 0	+ 87.1	- 4.0	1 6 0	-105.1	- 1.8
0 0 20	5.4	6.6	0 15 20	83.7	4.3	1 6 20	106.4	1.5
0 0 40	10.8	6.6	0 15 40	80.1	4.5	1 6 40	107.5	1.2
0 1 0	16.1	6.6	0 16 0	76.4	4.7	1 7 0	108.3	0.8
0 1 20	21.4	6.5	0 16 20	72.5	5.0	1 7 20	108.8	0.5
0 1 40	26.6	6.4	0 16 40	68.4	5.2	1 7 40	109.1	- 0.2
0 2 0	+ 31.8	+ 6.3	0 17 0	+ 64.1	- 5.4	1 8 0	-109.1	+ 0.1
0 2 20	36.9	6.2	0 17 20	59.6	5.5	1 8 20	108.9	0.5
0 2 40	42.0	6.1	0 17 40	55.0	5.7	1 8 40	108.4	0.8
0 3 0	46.9	6.0	0 18 0	50.3	5.9	1 9 0	107.6	1.1
0 3 20	51.7	5.8	0 18 20	45.5	6.0	1 9 20	106.6	1.4
0 3 40	56.4	5.7	0 18 40	40.5	6.1	1 9 40	105.3	1.8
0 4 0	+ 60.9	+ 5.5	0 19 0	+ 35.5	- 6.3	1 10 0	-103.8	+ 2.1
0 4 20	65.3	5.3	0 19 20	30.4	6.4	1 10 20	102.0	2.4
0 4 40	69.5	5.1	0 19 40	25.2	6.4	1 10 40	99.9	2.7
0 5 0	73.6	4.9	0 20 0	19.9	6.5	1 11 0	97.6	3.0
0 5 20	77.5	4.7	0 20 20	14.6	6.6	1 11 20	95.1	3.3
0 5 40	81.2	4.4	0 20 40	9.2	6.6	1 11 40	92.3	3.5
0 6 0	+ 84.7	+ 4.2	0 21 0	+ 3.8	- 6.6	1 12 0	- 89.3	+ 3.8
0 6 20	88.0	3.9	0 21 20	- 1.5	6.6	1 12 20	86.1	4.1
0 6 40	91.1	3.7	0 21 40	6.9	6.6	1 12 40	82.7	4.3
0 7 0	94.0	3.4	0 22 0	12.3	6.6	1 13 0	79.1	4.6
0 7 20	96.6	3.1	0 22 20	17.6	6.5	1 13 20	75.3	4.8
0 7 40	99.0	2.8	0 22 40	22.9	6.5	1 13 40	71.3	5.0
0 8 0	+101.1	+ 2.5	0 23 0	- 28.1	- 6.4	1 14 0	- 67.1	+ 5.2
0 8 20	103.0	2.2	0 23 20	33.3	6.3	1 14 20	62.8	5.4
0 8 40	104.7	1.9	0 23 40	38.4	6.2	1 14 40	58.3	5.6
0 9 0	106.1	1.6	1 0 0	43.4	6.1	1 15 0	53.7	5.8
0 9 20	107.3	1.3	1 0 20	48.3	5.9	1 15 20	49.0	5.9
0 9 40	108.1	0.9	1 0 40	53.1	5.8	1 15 40	44.1	6.1
0 10 0	+108.7	+ 0.6	1 1 0	- 57.7	- 5.6	1 16 0	- 39.1	+ 6.2
0 10 20	109.1	+ 0.3	1 1 20	62.2	5.4	1 16 20	34.0	6.3
0 10 40	109.1	- 0.1	1 1 40	66.6	5.2	1 16 40	28.9	6.4
0 11 0	109.0	0.4	1 2 0	70.8	5.0	1 17 0	23.7	6.5
0 11 20	108.6	0.7	1 2 20	74.8	4.8	1 17 20	18.4	6.5
0 11 40	107.9	1.0	1 2 40	78.6	4.6	1 17 40	13.0	6.6
0 12 0	+106.9	- 1.3	1 3 0	- 82.2	- 4.4	1 18 0	- 7.7	+ 6.6
0 12 20	105.7	1.7	1 3 20	85.6	4.1	1 18 20	- 2.3	6.6
0 12 40	104.2	2.0	1 3 40	88.9	3.8	1 18 40	+ 3.1	6.6
0 13 0	102.5	2.3	1 4 0	91.9	3.6	1 19 0	8.5	6.6
0 13 20	100.5	2.6	1 4 20	94.7	3.3	1 19 20	13.8	6.6
0 13 40	98.3	2.9	1 4 40	97.3	3.0	1 19 40	19.1	6.5
0 14 0	+ 95.8	- 3.2	1 5 0	- 99.6	- 2.7	1 20 0	+ 24.4	+ 6.5
0 14 20	93.1	3.5	1 5 20	101.7	2.4			
0 14 40	+ 90.2	- 3.7	1 5 40	-103.5	- 2.1			

## COORDINATES IN THE MEAN APPARENT ELLIPSE.

## SATELLITE II.

<i>t</i>	<i>z'</i>	<i>y'</i>	<i>t</i>	<i>z'</i>	<i>y'</i>	<i>t</i>	<i>z'</i>	<i>y'</i>
d h m	"	"	d h m	"	"	d h m	"	"
0 0 0	+ 0.0	+12.2	1 6 0	+139.5	- 7.3	2 12 0	-166.4	- 3.5
0 0 40	8.5	12.2	1 6 40	134.2	7.7	2 12 40	168.6	2.9
0 1 20	17.0	12.1	1 7 20	128.6	8.2	2 13 20	170.4	2.3
0 2 0	25.5	12.1	1 8 0	122.7	8.6	2 14 0	171.9	1.8
0 2 40	33.9	12.0	1 8 40	116.5	9.0	2 14 40	173.0	1.2
0 3 20	42.2	11.8	1 9 20	110.1	9.4	2 15 20	173.6	- 0.6
0 4 0	+ 50.5	+11.7	1 10 0	+103.4	- 9.8	2 16 0	-173.8	0.0
0 4 40	58.6	11.5	1 10 40	96.4	10.1	2 16 40	173.6	+ 0.6
0 5 20	66.5	11.3	1 11 20	89.2	10.5	2 17 20	172.9	1.2
0 6 0	74.3	11.0	1 12 0	81.7	10.8	2 18 0	171.8	1.8
0 6 40	81.9	10.8	1 12 40	74.1	11.0	2 18 40	170.3	2.4
0 7 20	89.4	10.5	1 13 20	66.3	11.3	2 19 20	168.4	3.0
0 8 0	+ 96.6	+10.1	1 14 0	+ 58.3	-11.5	2 20 0	-166.2	+ 3.5
0 8 40	103.6	9.8	1 14 40	50.2	11.7	2 20 40	163.5	4.1
0 9 20	110.3	9.4	1 15 20	42.0	11.8	2 21 20	160.4	4.7
0 10 0	116.7	9.0	1 16 0	33.7	12.0	2 22 0	156.9	5.2
0 10 40	122.9	8.6	1 16 40	25.3	12.1	2 22 40	153.0	5.8
0 11 20	128.8	8.2	1 17 20	16.8	12.1	2 23 20	148.8	6.3
0 12 0	+134.4	+ 7.7	1 18 0	+ 8.3	-12.2	3 0 0	-144.2	+ 6.8
0 12 40	139.6	7.3	1 18 40	- 0.2	12.2	3 0 40	139.3	7.3
0 13 20	144.5	6.8	1 19 20	8.8	12.2	3 1 20	134.1	7.8
0 14 0	149.0	6.3	1 20 0	17.3	12.1	3 2 0	128.5	8.2
0 14 40	153.2	5.7	1 20 40	25.7	12.1	3 2 40	122.6	8.6
0 15 20	157.0	5.2	1 21 20	34.1	12.0	3 3 20	116.4	9.0
0 16 0	+160.5	+ 4.7	1 22 0	- 42.4	-11.8	3 4 0	-109.9	+ 9.4
0 16 40	163.6	4.1	1 22 40	50.6	11.7	3 4 40	103.1	9.8
0 17 20	166.3	3.5	1 23 20	58.7	11.5	3 5 20	96.1	10.1
0 18 0	168.6	3.0	2 0 0	66.7	11.3	3 6 0	88.9	10.5
0 18 40	170.5	2.4	2 0 40	74.5	11.0	3 6 40	81.5	10.8
0 19 20	171.9	1.8	2 1 20	82.1	10.7	3 7 20	73.9	11.0
0 20 0	+172.9	+ 1.2	2 2 0	- 89.5	-10.4	3 8 0	- 66.1	+11.3
0 20 40	173.6	+ 0.6	2 2 40	96.7	10.1	3 8 40	58.1	11.5
0 21 20	173.8	0.0	2 3 20	103.7	9.8	3 9 20	50.0	11.7
0 22 0	173.6	- 0.6	2 4 0	110.4	9.4	3 10 0	41.8	11.8
0 22 40	172.9	1.2	2 4 40	116.8	9.0	3 10 40	33.5	12.0
0 23 20	171.8	1.8	2 5 20	123.0	8.6	3 11 20	25.1	12.1
1 0 0	+170.4	- 2.4	2 6 0	-128.9	- 8.2	3 12 0	- 16.6	+12.1
1 0 40	168.5	3.0	2 6 40	134.5	7.7	3 12 40	- 8.1	12.2
1 1 20	166.2	3.5	2 7 20	139.7	7.2	3 13 20	+ 0.4	12.2
1 2 0	163.5	4.1	2 8 0	144.6	6.7	3 14 0	9.0	12.2
1 2 40	160.4	4.7	2 8 40	149.1	6.2	3 14 40	17.5	12.1
1 3 20	157.0	5.2	2 9 20	153.3	5.7	3 15 20	26.0	12.1
1 4 0	+153.2	- 5.8	2 10 0	-157.1	- 5.2	3 16 0	+ 34.4	+12.0
1 4 40	149.0	6.3	2 10 40	160.6	4.6			
1 5 20	+144.4	- 6.8	2 11 20	-163.7	- 4.1			

## COORDINATES IN THE MEAN APPARENT ELLIPSE.

## SATELLITE III.

<i>t</i>	<i>x'</i>	<i>y'</i>	<i>t</i>	<i>x'</i>	<i>y'</i>	<i>t</i>	<i>x'</i>	<i>y'</i>
<sup>d</sup> <sup>h</sup> <sup>m</sup>	"	"	<sup>d</sup> <sup>h</sup> <sup>m</sup>	"	"	<sup>d</sup> <sup>h</sup> <sup>m</sup>	"	"
0 0 0	+ 0.0	+17.4	2 12 0	+225.4	-10.1	5 0 0	-262.3	- 5.6
0 1 20	13.5	17.4	2 13 20	217.3	10.8	5 1 20	266.4	4.8
0 2 40	26.9	17.3	2 14 40	208.6	11.5	5 2 40	269.8	4.0
0 4 0	40.3	17.2	2 16 0	199.5	12.1	5 4 0	272.6	3.2
0 5 20	53.6	17.1	2 17 20	189.9	12.7	5 5 20	274.7	2.3
0 6 40	66.8	16.9	2 18 40	179.9	13.3	5 6 40	276.2	1.5
0 8 0	+ 79.8	+16.7	2 20 0	+169.4	-13.8	5 8 0	-277.0	- 0.6
0 9 20	92.7	16.4	2 21 20	158.5	14.3	5 9 20	277.2	+ 0.2
0 10 40	105.3	16.1	2 22 40	147.2	14.8	5 10 40	276.7	1.1
0 12 0	117.6	15.8	3 0 0	135.6	15.2	5 12 0	275.5	1.9
0 13 20	129.7	15.4	3 1 20	123.7	15.6	5 13 20	273.7	2.7
0 14 40	141.5	15.0	3 2 40	111.5	16.0	5 14 40	271.2	3.6
0 16 0	+153.0	+14.5	3 4 0	+ 99.0	-16.3	5 16 0	-268.1	+ 4.4
0 17 20	164.1	14.0	3 5 20	86.3	16.6	5 17 20	264.4	5.2
0 18 40	174.7	13.5	3 6 40	73.3	16.8	5 18 40	260.1	6.0
0 20 0	184.9	13.0	3 8 0	60.2	17.0	5 20 0	255.1	6.8
0 21 20	194.7	12.4	3 9 20	47.0	17.2	5 21 20	249.5	7.6
0 22 40	204.1	11.8	3 10 40	33.6	17.3	5 22 40	243.3	8.3
1 0 0	+213.0	+11.1	3 12 0	+ 20.2	-17.4	6 0 0	-236.6	+ 9.1
1 1 20	221.4	10.5	3 13 20	+ 6.7	17.4	6 1 20	229.3	9.8
1 2 40	229.3	9.8	3 14 40	- 6.8	17.4	6 2 40	221.4	10.5
1 4 0	236.6	9.1	3 16 0	20.3	17.4	6 4 0	213.0	11.1
1 5 20	243.3	8.3	3 17 20	33.7	17.3	6 5 20	204.1	11.8
1 6 40	249.5	7.6	3 18 40	47.1	17.2	6 6 40	194.7	12.4
1 8 0	+255.1	+ 6.8	3 20 0	- 60.3	-17.0	6 8 0	-184.9	+13.0
1 9 20	260.0	6.0	3 21 20	73.4	16.8	6 9 20	174.7	13.5
1 10 40	264.3	5.2	3 22 40	86.3	16.6	6 10 40	164.1	14.0
1 12 0	268.0	4.4	4 0 0	99.0	16.3	6 12 0	153.0	14.5
1 13 20	271.1	3.6	4 1 20	111.5	16.0	6 13 20	141.5	15.0
1 14 40	273.6	2.7	4 2 40	123.7	15.6	6 14 40	129.7	15.4
1 16 0	+275.5	+ 1.9	4 4 0	-135.7	-15.2	6 16 0	-117.6	+15.8
1 17 20	276.7	1.1	4 5 20	147.2	14.8	6 17 20	105.2	16.1
1 18 40	277.2	+ 0.2	4 6 40	158.4	14.3	6 18 40	92.6	16.4
1 20 0	277.0	- 0.6	4 8 0	169.3	13.8	6 20 0	79.8	16.7
1 21 20	276.2	1.5	4 9 20	179.8	13.3	6 21 20	66.8	16.9
1 22 40	274.7	2.3	4 10 40	189.9	12.7	6 22 40	53.6	17.1
2 0 0	+272.6	- 3.2	4 12 0	-199.5	-12.1	7 0 0	- 40.3	+17.2
2 1 20	269.8	4.0	4 13 20	208.6	11.5	7 1 20	26.9	17.3
2 2 40	266.4	4.8	4 14 40	217.3	10.8	7 2 40	- 13.4	17.4
2 4 0	262.3	5.6	4 16 0	225.5	10.1	7 4 0	+ 0.1	17.4
2 5 20	257.6	6.4	4 17 20	233.1	9.4	7 5 20	13.6	17.4
2 6 40	252.3	7.2	4 18 40	240.1	8.7	7 6 40	27.0	17.3
2 8 0	+246.4	- 8.0	4 20 0	-246.5	- 8.0	7 8 0	+ 40.4	+17.2
2 9 20	240.0	8.7	4 21 20	252.3	7.2			
2 10 40	+233.0	- 9.4	4 22 40	-257.6	- 6.4			

## COORDINATES IN THE MEAN APPARENT ELLIPSE.

## SATELLITE IV.

<i>t</i>	<i>z'</i>	<i>y'</i>	<i>t</i>	<i>z'</i>	<i>y'</i>	<i>t</i>	<i>z'</i>	<i>y'</i>
<i>d h</i>	<i>"</i>	<i>"</i>	<i>d h</i>	<i>"</i>	<i>"</i>	<i>d h</i>	<i>"</i>	<i>"</i>
0 0	+ 0.0	+34.8	5 18	+406.2	-19.3	11 12	-449.0	-13.5
0 3	22.8	34.8	5 21	393.1	20.6	11 15	457.4	12.0
0 6	45.6	34.7	6 0	379.2	21.9	11 18	464.8	10.5
0 9	68.3	34.5	6 3	364.4	23.1	11 21	471.2	8.9
0 12	90.9	34.2	6 6	348.8	24.3	12 0	476.5	7.3
0 15	113.2	33.9	6 9	332.5	25.5	12 3	480.8	5.7
0 18	+135.3	+33.5	6 12	+315.4	-26.6	12 6	-484.0	- 4.1
0 21	157.1	33.0	6 15	297.6	27.6	12 9	486.2	2.5
1 0	178.5	32.4	6 18	279.2	28.5	12 12	487.3	- 0.8
1 3	199.6	31.8	6 21	260.2	29.4	12 15	487.3	+ 0.8
1 6	220.3	31.1	7 0	240.6	30.3	12 18	486.3	2.4
1 9	240.4	30.3	7 3	220.5	31.1	12 21	484.2	4.0
1 12	+260.0	+29.5	7 6	+199.9	-31.8	13 0	-480.9	+ 5.7
1 15	279.0	28.6	7 9	178.8	32.4	13 3	476.6	7.3
1 18	297.4	27.6	7 12	157.4	33.0	13 6	471.3	8.9
1 21	315.2	26.6	7 15	135.6	33.5	13 9	465.0	10.5
2 0	332.3	25.5	7 18	113.5	33.9	13 12	457.6	12.0
2 3	348.6	24.3	7 21	91.2	34.2	13 15	449.3	13.5
2 6	+364.1	+23.1	8 0	+ 68.7	-34.5	13 18	-440.0	+15.0
2 9	378.9	21.9	8 3	46.0	34.7	12 21	429.7	16.4
2 12	392.9	20.6	8 6	23.2	34.8	14 0	418.5	17.8
2 15	406.0	19.3	8 9	+ 0.3	34.8	14 3	406.3	19.2
2 18	418.2	17.9	8 12	- 22.5	34.8	14 6	393.2	20.6
2 21	429.5	16.5	8 15	45.3	34.7	14 9	379.3	21.9
3 0	+439.8	+15.0	8 18	- 68.0	-34.5	14 12	+364.6	+23.1
3 3	449.1	13.5	8 21	90.5	34.2	14 15	349.1	24.3
3 6	457.5	12.0	9 0	112.9	33.9	14 18	332.8	25.4
3 9	464.9	10.5	9 3	135.0	33.5	14 21	315.7	26.5
3 12	471.3	8.9	9 6	156.8	33.0	15 0	298.0	27.5
3 15	476.6	7.3	9 9	178.2	32.4	15 3	279.6	28.5
3 18	+480.8	+ 5.7	9 12	-199.3	-31.8	15 6	-260.5	+29.4
3 21	484.0	4.1	9 15	220.0	31.1	15 9	240.9	30.3
4 0	486.2	2.5	9 18	240.1	30.3	15 12	220.8	31.1
4 3	487.3	+ 0.8	9 21	259.7	29.5	15 15	200.2	31.8
4 6	487.3	- 0.8	10 0	278.7	28.6	15 18	179.2	32.4
4 9	486.3	2.4	10 3	297.2	27.6	15 21	157.7	33.0
4 12	+484.2	- 4.1	10 6	-315.0	-26.6	16 0	-135.9	+33.5
4 15	480.9	5.7	10 9	332.1	25.5	16 3	113.8	33.9
4 18	476.6	7.3	10 12	348.4	24.4	16 6	91.5	34.2
4 21	471.3	8.9	10 15	363.9	23.2	16 9	69.0	34.5
5 0	465.0	10.4	10 18	378.7	21.9	16 12	46.3	34.7
5 3	457.7	12.0	10 21	392.7	20.6	16 15	23.5	34.8
5 6	+449.3	-13.5	11 0	-405.8	-19.3	16 18	- 0.6	+34.8
5 9	439.9	15.0	11 3	418.0	17.9	16 21	+ 22.2	34.8
5 12	429.6	16.4	11 6	429.3	16.5	17 0	+ 45.0	+34.7
5 15	+418.4	-17.9	11 9	-439.6	-15.0			



# 482 JUPITER'S SATELLITES, 1872.

## SATELLITE I.

Date, 1872.	AT GEOCENTRIC SUPERIOR CONJUNCTION.			AT TIME OF ECLIPSE.		Date, 1872.	AT GEOCENTRIC SUPERIOR CONJUNCTION.			AT TIME OF ECLIPSE.	
	Factor for z'.	Factor for y'.	p.	z.	y.		Factor for z'.	Factor for y'.	p.	z.	y.
Jan. 1	1.214	+0.332	+12 <sup>8</sup> 44.0	-24	+4	June 4	0.870	+0.191	+13 <sup>8</sup> 32.5	+24	+1
8	1.220	0.336	12 22.1	-25	2	11	0.859	0.178	14 3.9	27	1
15	1.222	0.340	11 59.2			18	0.850	0.164	14 35.9	25	1
22	1.220	0.344	11 36.1	+25	2	26	0.842	0.150	15 8.1	+23	1
29	1.212	0.346	11 13.8	29	2	Sept. 1	0.834	+0.010	19 51.0	-22	0
Feb. 5	1.200	+0.346	+10 53.0	+32	+2	8	0.840	-0.006	+20 15.3	-23	+0
12	1.185	0.346	10 34.4	34	2	15	0.848	0.023	20 38.1	25	-0
19	1.167	0.344	10 18.8	36	2	22	0.857	0.040	20 59.4	26	0
26	1.147	0.340	10 6.9	38	2	29	0.867	0.057	21 19.1	28	0
Mar. 4	1.125	0.334	9 59.9	39	2	Oct. 6	0.879	0.074	21 37.2	29	0
11	1.101	+0.327	+ 9 55.0	+40	+2	13	0.892	-0.092	+21 53.6	-31	-1
18	1.077	0.319	9 55.1	40	2	20	0.907	0.110	22 8.3	32	1
25	1.053	0.311	9 59.4	39	2	27	0.923	0.128	22 21.4	34	1
Apr. 2	1.029	0.301	10 7.7	39	2	Nov. 4	0.941	0.146	22 32.8	35	1
9	1.007	0.290	10 19.7	39	2	11	0.960	0.165	22 42.5	36	1
16	0.986	0.279	10 35.1	38	2	18	0.980	0.183	22 50.5	37	1
23	0.965	+0.267	+10 53.7	+37	+2	25	1.001	-0.201	+22 56.7	-38	-1
30	0.946	0.255	11 15.2	35	2	Dec. 2	1.023	0.218	23 1.1	38	1
May 7	0.928	0.243	11 39.1	34	2	9	1.045	0.235	23 3.9	38	1
14	0.911	0.230	12 5.1	33	1	16	1.068	0.250	23 4.9	38	2
21	0.896	0.217	12 32.9	31	1	23	1.090	0.264	23 4.1	38	2
28	0.882	+0.204	+13 2.2	+30	+1	30	1.111	-0.276	+23 1.5	-37	-2

## SATELLITE II.

Date, 1872.	AT GEOCENTRIC SUPERIOR CONJUNCTION.			AT TIME OF ECLIPSE.		Date, 1872.	AT GEOCENTRIC SUPERIOR CONJUNCTION.			AT TIME OF ECLIPSE.	
	Factor for z'.	Factor for y'.	p.	z.	y.		Factor for z'.	Factor for y'.	p.	z.	y.
Jan. 3	1.217	+0.195	+12 <sup>8</sup> 55.5	-31	+4	June 7	0.866	+0.086	+13 <sup>8</sup> 59.1	+34	+1
10	1.221	0.200	12 33.1	-27	2	14	0.856	0.074	14 30.2	32	1
17	1.222	0.204	12 10.5	+24	2	21	0.847	0.061	15 1.7	29	1
24	1.219	0.207	11 47.9	30	2	28	0.840	+0.048	15 33.5	+27	+1
31	1.209	0.210	11 25.8	35	2	Sept. 4	0.836	-0.084	20 7.6	-27	-1
Feb. 7	1.196	+0.213	+11 5.7	+40	+2	11	0.843	-0.099	+20 30.6	-29	-1
14	1.180	0.214	10 48.1	44	2	18	0.851	0.115	20 52.1	32	1
21	1.161	0.213	10 33.5	47	2	25	0.861	0.131	21 12.0	34	2
28	1.140	0.211	10 23.0	49	2	Oct. 2	0.872	0.148	21 30.4	37	2
Mar. 7	1.117	0.208	10 16.4	51	2	9	0.885	0.165	21 47.2	39	2
14	1.093	+0.203	+10 13.5	+52	+2	17	0.899	-0.182	+22 2.3	-41	2
21	1.070	0.197	10 15.2	52	2	24	0.915	0.199	22 15.8	43	2
28	1.046	0.190	10 20.5	52	2	31	0.932	0.217	22 27.7	45	3
Apr. 4	1.023	0.182	10 29.8	52	2	Nov. 7	0.950	0.235	22 37.6	47	3
11	1.000	0.173	10 42.9	51	2	14	0.969	0.253	22 46.2	49	3
18	0.978	0.164	10 59.4	49	2	21	0.990	0.271	22 53.0	50	3
25	0.958	+0.154	+11 18.7	+47	2	28	1.012	-0.289	+22 58.0	-51	-3
May 2	0.939	0.144	11 40.7	45	2	Dec. 5	1.034	0.306	23 1.4	51	4
9	0.922	0.133	12 5.1	43	2	12	1.056	0.322	23 3.1	51	4
17	0.906	0.122	12 31.5	41	1	20	1.078	0.337	23 3.1	50	4
24	0.891	0.110	12 59.5	39	1	27	1.100	-0.351	+23 1.4	-49	-4
31	0.878	+0.098	+13 28.8	+37	+1						

# JUPITER'S SATELLITES, 1872. 483

## SATELLITE III.

Date,		AT GEOCENTRIC SUPERIOR CONJUNCTION.			AT TIME OF ECLIPSE.				Date,		AT GEOCENTRIC SUPERIOR CONJUNCTION.			AT TIME OF ECLIPSE.			
1872.		Factor for x'.	Factor for y'.	p.	Dia.		Reap.		1872.		Factor for x'.	Factor for y'.	p.	Dia.		Reap.	
					z.	y.	z.	y.						z.	y.	z.	y.
Jan. 1	1.215	+0.381	+12 33.2	36	47	"	"		June 7	0.866	+0.225	+13 36.8	"	"	46	44	
9	1.231	0.386	12 10.7	28	7				14	0.856	0.212	14 9.0			43	4	
16	1.222	0.389	11 47.4			+22	+7		21	0.847	0.199	14 41.8			39	3	
23	1.218	0.390	11 24.0			31	7		28	0.839	0.185	15 15.0			35	3	
30	1.210	0.391	11 1.4			39	7		Sept. 1	0.834	0.060	19 48.8	-32	+1			
Feb. 6	1.197	+0.390	+10 40.6			+47	+7		8	0.840	+0.045	+20 13.8	-36	+1			
13	1.181	0.388	10 22.2			54	7		16	0.848	0.029	20 37.1	40	0			
20	1.162	0.384	10 7.0	+21	+7	60	7		23	0.857	+0.013	20 58.8	43	+0			
28	1.142	0.379	9 55.7	26	7	65	7		30	0.868	-0.003	21 19.0	47	-0	-16	-0	
Mar. 6	1.120	0.372	9 48.4	30	6	68	6		Oct. 7	0.880	0.019	21 37.4	50	0	20	0	
13	1.096	+0.364	+9 45.3	+33	+6	+70	+6		14	0.894	-0.035	+21 54.2	-54	-1	23	-1	
20	1.072	0.355	9 46.5	35	6	71	6		21	0.909	0.051	22 57.2	58	1	26	1	
27	1.048	0.345	9 51.9	36	6	72	6		29	0.926	0.068	22 22.6	61	1	28	1	
Apr. 3	1.025	0.335	10 1.3	36	6	71	6		Nov. 5	0.944	0.085	22 34.1	64	1	30	1	
11	1.002	0.324	10 14.4	36	6	70	6		12	0.964	0.102	22 43.7	66	2	32	2	
18	0.980	0.312	10 31.0	35	5	68	5		19	0.985	0.119	22 51.6	68	2	33	2	
25	0.960	+0.300	+10 51.0	+33	+5	+66	+5		26	1.006	-0.135	+22 57.7	-69	-2	33	-2	
May 2	0.941	0.288	11 13.8	31	5	63	5		Dec. 3	1.028	0.150	23 2.0	69	3	33	3	
9	0.923	0.276	11 38.8	28	5	60	5		11	1.051	0.165	23 4.5	69	3	32	3	
16	0.907	0.264	12 6.0	25	5	57	5		18	1.073	0.178	23 5.1	68	3	30	3	
24	0.892	0.251	12 35.0	22	4	53	4		25	1.095	-0.190	+23 3.8	-66	-3	27	-3	
31	0.878	+0.238	+13 5.4	+19	+4	+50	+4										

## SATELLITE IV.

Date.		AT GEOCENTRIC SUPERIOR CONJUNCTION.			AT TIME OF ECLIPSE.				Date.		AT GEOCENTRIC SUPERIOR CONJUNCTION.			AT TIME OF ECLIPSE.			
1872.		Factor for x'.	Factor for y'.	p.	Dis.		Resp.		1872.		Factor for x'.	Factor for y'.	p.	Dis.		Resp.	
					z.	y.	z.	y.						z.	y.	z.	y.
Jan. 7	1.220	+0.306	+12 3.6	35	41	"	"	June 6	0.868	+0.179	+13 18.0	41	46	72	46		
24	1.217	0.310	11 9.6			+40	+11	22	0.846	0.155	14 32.5	+25	5	+55	5		
Feb. 9	1.191	0.308	10 20.7	+36	+11	73	11	Sept. 15	0.847	+0.024	20 23.4	-58	+1	-27	+1		
26	1.147	0.300	9 46.8	61	10	97	10	Oct. 2	0.871	-0.006	21 9.8	74	-0	42	-0		
Mar. 14	1.093	0.286	9 34.2	75	10	110	10	18	0.903	0.037	21 49.3	88	1	55	1		
30	1.037	+0.268	+9 44.5	+79	9	113	+9	Nov. 4	0.943	-0.069	+22 19.4	-100	-2	-66	-2		
Apr. 16	0.984	0.247	10 16.0	76	9	108	9	21	0.989	0.102	22 39.7	106	3	72	3		
May 3	0.938	0.225	11 5.1	67	8	99	8	Dec. 8	1.041	0.133	22 50.0	107	5	71	5		
20	0.899	+0.203	+12 7.4	+55	+7	+87	+7	24	1.093	-0.159	+22 50.3	-102	-5	-63	-5		

484 SATURN'S RING, &c., 1872.

THE APPARENT ELEMENTS OF SATURN'S RING.

Washington Mean Noon.	<i>a</i> Outer Major Axis.	<i>b</i> Outer Minor Axis.	<i>p</i> Inclination of Northern Semi-minor Axis to Circle of Declination from North to East.	<i>l</i> The Elevation of the Earth above the Plane of the Ring.	<i>l'</i> The Elevation of the Sun above the Plane of the Ring.	Earth's Longitude from Saturn counted on Plane of Ring from the Ring's As- cending Node on	
						Equator.	Ecliptic.
Jan. 1	34.02	14.43	+7 12.0	+25 5.8	+25 1.8	339 59.2	296 59.2
21	34.16	14.22	7 17.8	24 35.6	24 55.4	342 30.1	299 30.2
Feb. 10	34.62	14.12	7 22.4	24 4.8	24 48.7	344 52.0	301 52.1
March 1	35.37	14.16	7 25.7	23 36.3	24 42.0	346 53.6	303 53.8
21	36.38	14.34	7 27.7	23 13.3	24 35.1	348 27.1	305 27.3
April 10	37.58	14.67	7 28.8	22 58.6	24 28.1	349 26.0	306 26.3
30	38.85	15.12	7 29.2	22 53.6	24 20.9	349 45.7	306 46.1
May 20	40.05	15.66	7 28.9	23 1.0	24 13.5	349 25.0	306 25.4
June 9	41.01	16.22	7 27.9	23 17.4	24 6.0	348 28.2	305 28.7
29	41.55	16.68	7 26.2	23 40.2	23 58.3	347 5.7	304 6.3
July 19	41.56	16.95	7 24.0	24 4.7	23 50.4	345 33.3	302 33.9
Aug. 8	41.04	16.96	7 21.6	24 26.4	23 42.4	344 9.0	301 9.6
28	40.10	16.75	7 19.8	24 41.6	23 34.1	343 9.9	300 10.6
Sept. 17	38.90	16.32	7 19.2	24 48.4	23 25.8	342 48.1	299 48.9
Oct. 7	37.63	15.77	7 19.9	24 45.9	23 17.3	343 8.1	300 9.0
27	36.44	15.15	7 21.9	24 34.0	23 8.6	344 8.3	301 9.3
Nov. 16	35.44	14.54	7 24.7	24 13.2	22 59.8	345 43.4	302 44.4
Dec. 6	34.69	13.97	7 28.7	23 44.4	22 50.8	347 46.0	304 47.0
26	34.25	13.47	7 30.3	23 9.3	22 41.6	350 5.4	307 6.5
32	34.18	13.35	+7 30.9	+23 59.3	+22 39.3	350 41.9	307 43.1

Factor which is to be multiplied by *a* and *b* to obtain the axes of

The inner ellipse of the outer Ring	=0.8801	log. Factor=9.9445
The outer ellipse of the inner Ring	=0.8599	" =9.9344
The inner ellipse of the inner Ring	=0.6650	" =9.8228
The inner ellipse of Bond's dusky Ring	=0.5486	" =9.7392

NOTE.—The sign of *l* indicates whether the visible surface of the Ring is northern or southern.

THE APPARENT DISCS OF VENUS AND MARS.

The Versed Sines of their Illuminated Portions, divided by their Apparent Diameters.

1872.	Venus.	Mars.	1872.	Venus.	Mars.
January 1	.623	.963	July 29	.998	.988
January 31	.731	.977	August 28	.994	.976
March 1	.816	.988	September 27	.941	.960
March 31	.873	.995	October 27	.891	.942
April 30	.937	.999	November 26	.827	.924
May 30	.964	1.000	December 26	.748	.908
June 29	.997	.996			

## WASHINGTON MEAN TIME.

## PLANETARY CONSTELLATIONS.

Jan.	d	h	m																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	</
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## WASHINGTON MEAN TIME.

## PLANETARY CONSTELLATIONS.

				d	h	m	
July	2	10	8	☉ in Apogee.			
	3	21	26	♂	♂	♂	♂ - 0 58
	4	18	22	♂	♂	♂	♂ - 1 58
	6	6	13	♂	♂	♂	♂ - 1 55
	6	9	21	♂	♂	♂	♂ - 3 21
	6	18	41	♂	♂	♂	♂ - 3 39
	7	2	45	♂	♂	♂	♂ + 1 18
	9	6	15	♂	♂	♂	♂ + 1 12
	10	1	33	♂	♂	♂	♂ + 1 12
	15	12	37	♂	♂	♂	♂ in Sup.
	18	0	33	☐	♂	♂	♂
	19	3	5	♂	♂	♂	♂ + 3 12
	21	11	53	♂	♂	♂	♂ + 0 23
	23	11	20	♂	♂	♂	♂ in ☿
	25	2	8				
	25	7	9	♀	♀	♀	♀ in Perihelion.
	25	21	46	♂	♂	♂	♂ + 2 5
	28	9	14	♂	♂	♂	♂ + 0 41
	29	2	6	♂	♂	♂	♂ stationary.
	Aug. 1	17	30	♂	♂	♂	♂ - 2 17
	2	10	57	♂	♂	♂	♂
	2	14	37	♂	♂	♂	♂ greatest elong. E. 27 21
	2	18	36	♂	♂	♂	♂ - 3 27
	3	12	31	♂	♂	♂	♂ - 3 56
	4	2	8	♂	♂	♂	♂ - 3 28
	4	6	29	♂	♂	♂	♂ in Aphelion.
	5	21	2	♂	♂	♂	♂ - 7 45
	15	10	42	♂	♂	♂	♂ + 3 8
	15	16	48	♂	♂	♂	♂ stationary.
	16	7	3	♀	♀	♀	♀ greatest Hel. Lat. N.
	22	6	4	♂	♂	♂	♂ + 1 50
	22	21	46	♂	♂	♂	♂ - 6 29
	23	5	46	♂	♂	♂	♂ + 0 30
	24	16	25	♂	♂	♂	♂ greatest Hel. Lat. S.
	30	2	42	♂	♂	♂	♂ Inf.
	30	3	58	♂	♂	♂	♂ - 3 37
	30	12	21	♂	♂	♂	♂ - 3 18
	31	6	33	♂	♂	♂	♂ - 4 12
	Sept. 1	14	44	♂	♂	♂	♂ - 8 57
	3	9	31	♂	♂	♂	♂ - 3 49
	7	18	22	♂	♂	♂	♂ stationary.
	11	17	34	♂	♂	♂	♂ + 3 13
	12	16	18	♂	♂	♂	♂ in ☿
	15	8	53	♂	♂	♂	♂ greatest elong. W. 17 53
	17	6	7	♂	♂	♂	♂ in Perihelion.
	17	20	46	♂	♂	♂	♂ stationary.
	18	15	7	♂	♂	♂	♂ + 1 39
	20	23	14	♂	♂	♂	♂ + 0 38
	22	0	46	☉	☉	☉	☉ enters ♎ autumn com.
	26	13	28	♂	♂	♂	♂ - 3 52
	27	13	42	♂	♂	♂	♂ greatest Hel. Lat. N.
	28	0	31	♂	♂	♂	♂ - 4 29
				d	h	m	
Sept.	28	6	45	♂	♂	♂	♂ - 3 56
	Oct. 1	1	44	♂	♂	♂	♂ - 3 5
	3	15	52	♂	♂	♂	♂ - 2 34
	7	5	29	☐	♂	♂	♂
	9	0	7	♂	♂	♂	♂ + 3 25
	11	8	35	♀	♀	♀	♀ in ☿
	12	12	45	♂	♂	♂	♂ in Sup.
	15	23	45	♂	♂	♂	♂ + 1 38
	17	6	5	♂	♂	♂	♂ in ☿
	21	1	24				
	23	22	46	♂	♂	♂	♂ - 4 5
	25	17	29	♂	♂	♂	♂ - 4 41
	27	1	6	♂	♂	♂	♂ - 4 0
	28	4	31	☐	♂	♂	♂
	31	5	44	♂	♂	♂	♂ in Aphelion.
Nov.	1	10	11	♂	♂	♂	♂ - 2 25
	2	18	32	♂	♂	♂	♂ - 0 25
	2	23	0	♂	♂	♂	♂ greatest Hel. Lat. N
	5	7	58	♂	♂	♂	♂ + 3 38
	10	5	31	♂	♂	♂	♂ stationary.
	12	6	41	♂	♂	♂	♂ + 1 44
	14	-	-	♂	♂	♂	♂ eclipsed, vis. at Wash.
	14	15	28	♂	♂	♂	♂ in Aphelion.
	20	7	5	♂	♂	♂	♂ - 4 10
	20	15	41	♂	♂	♂	♂ greatest Hel. Lat. S.
	21	18	18	☐	♂	♂	♂
	22	7	47	♂	♂	♂	♂ - 4 42
	24	18	57	♂	♂	♂	♂ - 3 26
	27	6	29	♂	♂	♂	♂ greatest elong. E. 21 32
	30	-	-	☉	☉	☉	☉ eclipsed, invis. at Wash.
Dec.	1	14	35	♂	♂	♂	♂ + 0 35
	2	15	57	♂	♂	♂	♂ + 1 41
	2	18	57	♂	♂	♂	♂ + 3 47
	4	7	55	♂	♂	♂	♂ - 1 59
	6	3	7	♂	♂	♂	♂ stationary.
	7	5	5	♂	♂	♂	♂ greatest Hel. Lat. S.
	7	14	4	♂	♂	♂	♂ in Aphelion.
	8	16	0	♂	♂	♂	♂ in ☿
	9	11	53	♂	♂	♂	♂ + 1 48
	9	15	34	♂	♂	♂	♂ in ☿
	14	5	23	♂	♂	♂	♂ in Perihelion.
	15	17	49	♂	♂	♂	♂ Inf.
	16	8	27	♂	♂	♂	♂ stationary.
	17	13	45	♂	♂	♂	♂ - 4 5
	19	17	28	♂	♂	♂	♂ - 4 31
	20	18	45	☉	☉	☉	☉ enters ♏, winter com.
	23	10	53	♂	♂	♂	♂ - 2 16
	24	12	58	♂	♂	♂	♂ greatest Hel. Lat. N.
	25	23	54	♂	♂	♂	♂ stationary.
	28	2	0	♂	♂	♂	♂ + 4 5
	30	9	24	♂	♂	♂	♂ + 3 54

# LATITUDES AND LONGITUDES OF THE PRINCIPAL OBSERVATORIES.

- Åbo** . . . . . N. Lat.  $60^{\circ} 26' 56''.8 \pm 0''.11$ . ARGELANDER, *Obs. Astron.*, I. p. xxi.  
Long. E. from Paris,  $1^h 19^m 47^s.3$ . ARGELANDER, *Astr. Nachr.*, IX. 264.
- Albany, (Dome)** . N. Lat.  $42^{\circ} 39' 49''.5$ . *Report Regents Univ.*, N. Y., p. 59.  
Long. E. from New York,  $0^h 0^m 57^s.40 \pm 0^s.01$ . GOULD, *Coast Survey Report*, 1861, p. 232.
- Altona** . . . . . N. Lat.  $53^{\circ} 32' 45''.27$ . GAUSS, *Bestimmung des Breitenunterschiedes*, &c., p. 71.  
Long. E. from Greenwich,  $0^h 39^m 46^s.15 \pm 0^s.04$ . STRUVE, *Exped. Chronom.*, 1844, p. 206.
- Ann Arbor** . . . N. Lat.  $42^{\circ} 16' 48''$ . BRÜNNOW, *Astron. Journal*, V. 112.  
Long. W. from Cambridge,  $0^h 50^m 24^s.21 \pm 0^s.05$ . BRÜNNOW, *Astr. Notices*, 27.
- Armagh** . . . . . N. Lat.  $54^{\circ} 21' 12''.70$ . ROBINSON, *Places of Stars*, &c., p. x.  
Long. W. from Greenwich,  $0^h 26^m 35^s.47$ . *Ibid.*, p. xi.
- Athens, (Mer. Cir.)** N. Lat.  $37^{\circ} 58' 20'' \pm 1''$ . BOUREIS, *Astr. Nachr.*, XXXIII. 197.  
Long. E. from Hamburg,  $0^h 55^m 1^s.63$ . BOUREIS, *Erg. Heft s. d. Astr. Nachr.*, p. 150.
- Berlin, (Dome)** . N. Lat.  $52^{\circ} 30' 16''.68 \pm 0''.2$ . ENCKE, *Astr. Nachr.*, XXIII. 372.  
Long. E. from Brussels,  $0^h 36^m 6^s.48 \pm 0^s.1$ . ENCKE, *Abhandl. der Berliner Akad. d. Wissenschaften*, 1858, p. 80.
- Bilk** . . . . . N. Lat.  $51^{\circ} 12' 25''$ . BRÜNNOW, *Astr. Nachr.*, XXVII. 300.  
Long. W. from Berlin,  $0^h 26^m 30^s$ . *Ibid.*
- Bonn** . . . . . N. Lat.  $50^{\circ} 43' 45''.0$ . } ARGELANDER, *Ast. Jour.*, III. 18.  
Long. E. from Paris,  $0^h 19^m 3^s.0$ . }  
The provisional Observatory on the "Alter Zoll," in which were made the observations published in Vol. I. of the Bonn series, was situated  
N. Lat.  $50^{\circ} 44' 9''$ . }  
Long. E. from Paris,  $0^h 19^m 5^s.5$ . } *Bonner Astr. Beob.*, I. p. i.
- Breslau** . . . . . N. Lat.  $51^{\circ} 6' 56''.5$ . GALLE, *Berliner Astr. Jahrbuch*, 1866, p. 286.  
Long. E. from Paris,  $0^h 58^m 48^s.85$ . SADEBECK, (geodetic from Russia.)  
GALLE, *Astr. Nachr.*, LV. 195.  
Long. E. from Berlin,  $0^h 14^m 34^s.37$ . KLINGER, (from occultations.)  
*Ibid.*

These give, referred to Greenwich :—

The former, by the old longitude of Paris,	$\begin{matrix} h & m & s \\ 1 & 8 & 9.71 \end{matrix}$
The latter, " new " " Berlin.	$\begin{matrix} 9.85 \end{matrix}$
Whence we may adopt	$\begin{matrix} 1 & 8 & 9.8 \end{matrix}$

Brussels . . . N. Lat.  $50^{\circ} 51' 10''.7$ . QUETELET, *Annales de l'Obs. de Bruxelles*, 1837, p. 264.

Long. E. from Greenwich,  $0^h 17^m 28^s.9$ . AIRY, *Mem. R. Astr. Soc.*, XXIV. 26.

Cambridge, (Eng.) N. Lat.  $52^{\circ} 12' 51''.76$ . *Camb. Phil. Trans.*, V. 279.

Long. E. from Greenwich,  $0^h 0^m 22^s.69$ . CHALLIS, *Monthly Not. R. Astr. Soc.*, XIV. 195.

Cambridge, (Mass.) N. Lat.  $42^{\circ} 22' 48''.60$ . PEIRCE, *Mem. Amer. Acad. N. S.*, II. 203.

Red'n to Dome, —  $0''.5$ . BOND, *Annals Harv. Coll. Obs.*, I. xvii.

Long. E. from New York,  $0^h 11^m 26^s.07$ . WALKER, *Astr. Jour.*, III. 18.

Cape of Good Hope. S. Lat.  $33^{\circ} 56' 3''.2$ . MACLEAR, *Mem. R. Astr. Soc.*, XXXIII. p. 2

Long. E. from Greenwich,  $\begin{matrix} h & m & s \\ 1 & 13 & 56.1 \end{matrix}$  *Ibid.*, p. 126.

" E. " Cambridge,  $\begin{matrix} h & m & s \\ 1 & 13 & 31.5 \end{matrix}$  " p. 127.

" W. " Åbo,  $\begin{matrix} h & m & s \\ 0 & 15 & 10.2 \end{matrix}$  " p. 128.

" E. " Edinburgh,  $\begin{matrix} h & m & s \\ 1 & 26 & 37.2 \end{matrix}$  " p. 129.

" W. " Madras,  $\begin{matrix} h & m & s \\ 4 & 7 & 1.56 \end{matrix}$  " xii. p. 137.

These give, referred to Greenwich by the longitudes of this table—

By Greenwich occultations,  $\begin{matrix} h & m & s \\ 1 & 13 & 56.1 \end{matrix}$

By Cambridge "  $54.46$

By Åbo "  $57.73$

By Edinburgh "  $54.15$

By Madras "  $55.62$

Whence we may adopt  $1\ 13\ 55.7$ , giving the first a double weight.

Chicago . . . N. Lat.  $41^{\circ} 50' 1''$ . } SAFFORD, from *Report of*  
Long. W. from Ann Arbor,  $0^h 15^m 31^s.59$ . } *Lake Survey*.

Christiania . . . N. Lat.  $59^{\circ} 54' 43''.7$ . HANSTEEN, *Astr. Journal*, II. 173.

Long. W. from Copenhagen,  $0^h 7^m 25^s.0$ . HANSTEEN, *Astr. Nachr.*, XXXII. 301.

Clinton . . . N. Lat.  $43^{\circ} 3' 16''.5$ . *Report of Regents of Univ. N. Y.*, p. 59.

Long. W. from Cambridge,  $0^h 17^m 6^s.46$ . PETERS, *Ibid.*, p. 32.

Copenhagen . . . (New Observatory.)

N. Lat.  $55^{\circ} 41' 13''.6 \pm 0''.15$ . THIELE, *Astr. Nachr.*, LVI. 356.

Long. E. from Altona,  $0^h 10^m 32^s.51$ . PETERS, *Mss. communication*.

The old Observatory, or Round Tower, is situated—

N. Lat.  $52^{\circ} 40' 53''.0$ . SCHUMACHER, *Astr. Nachr.*, V. 366.

Long. E. from Holkens Bastion,  $0^s.57$ . WURM, *Astr. Nachr.*, III. 438, V. 337.

Holkens Bastion was occupied as the Observatory for many years previous to the erection of the new building in 1861. *Astr. Nachr.*, XIX. 119.

Long. E. from Altona,  $\begin{matrix} h & m & s \\ 0 & 10 & 32.585 \end{matrix}$ . HANSEN, *Astr. Nachr.*, VIII. 281.

$32.565$ . SCHUMACHER, *Astr. Nachr.*, IX. 163

Mean by weights,  $0\ 10\ 32.583$ .

- Cracow** . . . N. Lat.  $50^{\circ} 3' 50''.0 \pm 0''.09$ . WRISSE, *Astr. Nachr.*, XVI. 256.  
Long. E. from Paris,  $1^h 10^m 29^s.78$ . *Astr. Journal*, III. 19.
- Dorpat** . . . N. Lat.  $58^{\circ} 22' 47''.05$ . STRUVE, *Obs. Astron.*, VI. p. lx.  
Long. E. from Paris,  $1^h 37^m 33^s.0$ . STRUVE, *Vermessung Livlands*,  
p. 35, *Mem. Acad. Scie.*, Vol. IV.
- Dublin** . . . N. Lat.  $53^{\circ} 23' 13''.0$ .  
Long. W. from Greenwich,  $0^h 25^m 22^s$ . } *Astr. Nachr.*, X. 274.
- Durham** . . . N. Lat.  $54^{\circ} 46' 6''.4$ . *Astr. Nachr.*, XXVI. 215.  
Long. W. from Greenwich,  $0^h 6^m 19^s.75$ . *Monthly Not. R. Astr. Soc.*,  
XII. 35.
- Edinburgh** . . N. Lat.  $55^{\circ} 57' 23''.2$ . *Edinb. Observations*, XII. p. v.  
Long. W. from Greenwich,  $0^h 12^m 43^s.05$ . AIRY, *Monthly Not. R. Astr.*  
*Soc.*, XVIII. 254.
- Florence** . . . (Observatory of the College.)  
N. Lat.  $43^{\circ} 46' 40''.8$ . ZACH, *Corresp. Astron.*, I. 15.  
Long. E. from Paris,  $0^h 35^m 42^s.1$ . *Ibid.*, p. 14.  
The *Specola del Museo Reale* is situated, according to the same authority,  
N. Lat.  $43^{\circ} 46' 4''.3$ , p. 11.  
Long. E. from Paris,  $0^h 35^m 40^s.2$ , p. 14.
- Geneva** . . . N. Lat.  $46^{\circ} 11' 58''.84$ . PLANTAMOUR, *Mém. Soc. de Phys. et d'Hist.*  
*Nat.*, XI. 15.  
Long. E. from Paris,  $0^h 15^m 16^s.22$ . *Astr. Nachr.*, XX. 7.
- Georgetown** . . Lat.  $0' 47''.42$  North } of Naval Obs. dome. CURLEY, *Astr. Journal*,  
(Dome.) Long.  $0^m 6^s.20$  West } I. 69, 70.
- Göttingen** . . . N. Lat.  $51^{\circ} 31' 47''.85$ . GAUSS, *Bestimmung des Breitenunterschiedes*,  
(Mer. Circle.) &c., p. 71.  
Long. W. from Altona,  $0^m 0^s.049$ . *Ibid.*  
For the old Observatory,  
N. Lat.  $51^{\circ} 31' 55''.6$ . *Monatl. Corresp.*, XXVII. 483.  
Long. E. from Paris,  $0^h 30^m 25^s.2$ . *Astr. Nachr.*, II. 407-8.
- Gotha** . . . (New Observatory.)  
N. Lat.  $50^{\circ} 56' 37''.46$ . HANSEN, *Abhandl. d. k. Sächs. Gesellschaft*,  
VIII. 242.  
Long. W. from Leipzig,  $0^h 6^m 43^s.485 \pm 0^s.016$ . *Ibid.*, p. 320.  
For the old Observatory on the Seeberg,  
N. Lat.  $50^{\circ} 56' 5''.19$ . GAUSS, *Bestimmung des Breitenunterschiedes*,  
&c., p. 80.  
Long. E. from new Observatory,  $0^m 4^s.60$ . HANSEN, *Abhandl. d. Sächs.*  
*Ges.*, VIII. 241.
- Greenwich** . . . N. Lat.  $51^{\circ} 28' 38''.2$ . *Greenwich Observations*, 1864, p. lxi.  
Long. E. from Foilhommerum,  $0^h 41^m 33^s.29$  AIRY.  
Foilhommerum E. from Heart's Content,  $2^h 51^m 56^s.54$  GOULD.  
Heart's Content E. from Calais,  $0^h 55^m 37^s.72$  "  
Calais E. from Bangor,  $0^h 6^m 0^s.31$  "  
Bangor E. from Cambridge,  $0^h 9^m 22^s.99$  WALKER.  
Long. E. from Cambridge,  $4^h 44^m 30^s.85$   
Cambridge E. from New York,  $0^h 11^m 26^s.07$  } WALKER, *Astr.*  
New York E. from Washington,  $0^h 12^m 15^s.47$  } *Jour.*, III. 18.  
Long. E. from Washington,  $5^h 8^m 12^s.39$  GOULD, *Report*  
*to Coast Survey on Trans-Atlantic Longitudes.*



- Hamburg** . . . N. Lat.  $53^{\circ} 33' 7''$ . RÜMKE, *Mittlere Oerter*, &c., p. ii.  
Long. E. from Altona,  $0^h 0^m 7^s.41$ . HANSEN, *Astr. Nachr.*, VIII. 277.
- Helsingfors** . . . N. Lat.  $60^{\circ} 9' 42''.6$ . ARGELANDER, *Astr. Nachr.*, XIV. 205.  
Long. E. from Paris,  $1^h 30^m 28^s.3$ . STRUVE, *Table des Positions Geogr. en Russie*, p. 12.
- Hudson** . . . N. Lat.  $41^{\circ} 14' 42''.6$ . LOOMIS, *Trans. Amer. Phil. Soc. N. S.*, X. 61.  
Long. W. from Washington,  $0^h 17^m 32^s.06$ . *Astr. Journal*, III. 20.
- Kasan** . . . N. Lat.  $55^{\circ} 47' 24''.17$ . KOWALSKI, *Astr. Nachr.*, LIV. 117.  
Long. E. from Pulkowa,  $1^h 15^m 10^s.08$ . STRUVE, *Exped. Chron.*, 1850.
- Königsberg** . . . N. Lat.  $54^{\circ} 42' 50''.56$ . LUTHER, *Astr. Nachr.*, XLV. 314.  
Long. E. from Berlin,  $0^h 28^m 24^s.1$ . ENCKE, *Abh. d. k. Akad. Urnersch. Berlin*, 1858, p. 99.
- Kremsmünster** . . . N. Lat.  $48^{\circ} 3' 23''.69 \pm 0''.28$ . RESLHÜBER, *Astr. Nachr.*, XXXVII. 269.  
Long. W. from Vienna,  $0^h 8^m 59^s.064 \pm 0^s.03$ . *Ibid.*
- Leipzig** . . . (New Observatory.)  
N. Lat.  $51^{\circ} 20' 6''.3$ . BRUHNS, *Astr. Nachr.*, LXVII. 264.  
Long. W. from Berlin,  $0^h 4^m 0^s.895 \pm 0^s.02$ . BRUHNS and FÖRSTER, *Bestimmung der Langendifferenz*, &c.  
The Pleissenburg is situated—  
N. Lat.  $51^{\circ} 20' 20''.5$ . D'ARREST, *Astr. Nachr.*, XXIX. 280.  
Long. W. from Berlin,  $0^h 4^m 5^s.27$ . *Ibid.*  
BRUHNS found by geodetic measurement a difference of  $10''.74$  in latitude and  $4^s.00$  in longitude between the two observatories.  
*Geschichte u. Beschreibung d. Leipziger Sternwarte*, p. 19.
- Leyden** . . . (New Observatory.)  
N. Lat.  $52^{\circ} 9' 20''.3$ .  
Long. E. from Greenwich,  $17^m 56^s.18$ . } KAISER, *Astr. Nachr.*, LX. 284.  
(Old Observatory.)  
N. Lat.  $52^{\circ} 9' 27''.4$ .  
Long. E. from Greenwich,  $17^m 56^s.80$ . } *Idem.*
- Liverpool** . . . (Old Observatory.)  
N. Lat.  $53^{\circ} 24' 47''.72$ . HARTNUP, *M. Notices R. Astr. Soc.*, XIII. 247.  
Long. W. from Greenwich,  $0^h 12^m 0^s.05$ . AIRY, *Mem. R. Astr. Soc.*, XVI. 275.  
(New Observatory.)  
N. Lat.  $53^{\circ} 24' 3''.8$ . *M. Notices R. Astr. Soc.*, XXVIII. 81.  
Long. W. from Greenwich,  $0^h 12^m 17^s.15$ . *Ibid.*, p. 82.
- Madras** . . . N. Lat.  $13^{\circ} 4' 9''.2$ . TAYLOR, *Madras Gen. Catal.*, Pref., p. ii.  
Long. E. from Greenwich,  $5^h 20^m 57^s.28$ . TAYLOR, *Mem. R. Astr. Soc.*, XVI. 5.
- Mannheim** . . . N. Lat.  $49^{\circ} 29' 12''.9$ . *Astr. Nachr.*, XII., 129.  
Long. E. from Paris,  $0^h 24^m 30^s.04$ . *Astr. Journal*, III. 21.

- Markree** . . . N. Lat.  $54^{\circ} 10' 31''.77$ . *Astr. Journal*, II. 12.  
Long. W. from Greenwich,  $0^h 33^m 48^s.4$ . *Naut. Alman.*, 1855, p. 594.
- Marseilles** . . . N. Lat.  $43^{\circ} 17' 49''$ . *Monatl. Corresp.* XIII. 139.  
Long. E. from Paris,  $0^h 12^m 7^s.53$ . *Astr. Journal*, III. 21.
- Milan** . . . . (Brera.)  
N. Lat.  $45^{\circ} 28' 0''.7$ . *ZACH, Corresp. Astron.*, V. 300.  
Long. E. from Paris,  $0^h 27^m 25''.18$ . *Astr. Journal*, III. 21.
- Modena** . . . N. Lat.  $44^{\circ} 38' 52''.75$ . *BIANCHI, Atti del Real Osservatorio di Modena*,  
I. 336.  
Long. E. from Paris,  $0^h 34^m 22^s.51$ . *Astr. Journal*, III. 21.
- Moscow** . . . N. Lat.  $55^{\circ} 45' 19''.83 \pm 0''.08$ . *SCHWEIZER, Astr. Nachr.*, XXXVIII. 100.  
Long. E. from Pulkowa,  $0^h 28^m 58^s.23 \pm 0^s.03$ . *STRUVE, Exped. Chron.*,  
1845, p. 130.
- Munich** . . . (Bogenhausen.)  
N. Lat.  $48^{\circ} 8' 45''$ . *SOLDNER, Astr. Nachr.*, IX. 422.  
Long. E. from Paris,  $0^h 37^m 4^s.98$ . *WURM, Astr. Nachr.*, VIII. 148.
- Naples** . . . . (Capodimonte.)  
N. Lat.  $40^{\circ} 51' 46''.63$ . *BRIOSONI, Astr. Nachr.*, V. 294.  
Long. E. from Paris,  $0^h 47^m 37^s.93$ . *Effem. di Milano*, 1867, p. 99.
- New York** . . . (Mr. Rutherford's Observatory.)  
N. Lat.  $40^{\circ} 43' 48''.53$ . U. S. Coast Survey. *Amer. Journal Science*,  
XXXIX. 304.  
Long. E. from Washington,  $0^h 12^m 15^s.47$ . *Astr. Journal*, III. 18.
- Nicolajew** . . . N. Lat.  $46^{\circ} 58' 20''.6$ . *KNORRE, Astr. Nachr.*, VII. 261.  
Long. E. from Pulkowa,  $0^h 6^m 35^s.47$ . *STRUVE, Exped. Chron. de*,  
1846, p. 46.
- Olmütz** . . . . N. Lat.  $49^{\circ} 35' 43''.0$ . *SCHMIDT, Astr. Nachr.*, XXXIX. 49.  
Long. E. from Kremsmünster,  $0^h 12^m 30^s.40$ . *SCHMIDT, Astr. Nachr.*,  
XLV. 46.
- Oxford** . . . . N. Lat.  $51^{\circ} 45' 35''.5$ . *Radcliffe Observ.*, 1864, pp. xxxvii, lxiii.  
Long. W. from Greenwich,  $0^h 5^m 2^s.6$ . *Ibid.*, p. xxxvi.
- Padua** . . . . N. Lat.  $45^{\circ} 24' 2''.5$ . *SANTINI, Astr. Nachr.*, XVII. 346.  
Long. E. from Paris,  $0^h 38^m 8^s.15$ . *WOLFERS, Berl. Astr. Jahrb.*, 1866,  
p. 292.
- Palermo** . . . N. Lat.  $38^{\circ} 6' 44''$ . *CACCIATORE, Annal. d. Wiener Sternwarte*, XXIV. 6.  
Long. E. from Paris,  $0^h 44^m 4^s.0$ . *DAUSSY, Conn. des Temps.*, 1835,  
*addit.*, p. (8).
- Paramatta** . . . S. Lat.  $33^{\circ} 48' 49''.79$ . *RÜMCKER, Phil. Trans.*, 1829, III. 16.  
Long. E. from Greenwich,  $10^h 4^m 6^s.25$ . *Ibid.*, p. 29.

Paris . . . . N. Lat.  $48^{\circ} 50' 13''.22$  is generally adopted, as determined by ARAGO  
(Southern face.) and MATHIEU.

LANGIER, with Gambey circle,	$48^{\circ} 50' 11''.19$
MAUVAIS, " Fortin, "	11.85
5 observers, 1856-7, with Gambey circle,	11.80
6 " 1857-60 " " "	11.61
5 " 1860-1 " " "	11.71
YVON VILLARCEAU, " Rigaud, "	10.56

YVON VILLARCEAU, *Determinations Astr. en*, 1863, p. 9.

Long. E. from Greenwich,  $0^{\text{h}} 9^{\text{m}} 20^{\text{s}}.63$ . AIRY, *M. Not. R. Astr. Soc.*,  
XV. 124.

Philadelphia . . (Old High School Observatory.)  
N. Lat.  $39^{\circ} 57' 7''.5$ . KENDALL. } *Astron. Journ.*,  
Long. E. from Washington,  $0^{\text{h}} 7^{\text{m}} 33^{\text{s}}.64$ . WALKER, } III. 22.

Prague . . . . N. Lat.  $50^{\circ} 5' 18''.5$ . DAVID, *Astr. Nachr.*, VIII. 198.  
Long. E. from Paris,  $0^{\text{h}} 48^{\text{m}} 20^{\text{s}}.50$ . *Astr. Journal*, III. 22.

Pulkowa . . . . N. Lat.  $59^{\circ} 46' 18''.07$ . STRUVE, *Description de l'Observ. de Poulkova*,  
p. 290.  
Long. E. from Altona,  $1^{\text{h}} 21^{\text{m}} 32^{\text{s}}.523 \pm 0^{\text{s}}.039$ . STRUVE, *Exped.*  
*Chronom. de 1848*, p. 144.

Rome . . . . (Collegio Romano.)  
N. Lat.  $41^{\circ} 53' 53''.72$ . SECCHI, *Memorie del nuovo Osservatorio*, p. 123.  
Long. E. from Greenwich,  $0^{\text{h}} 49^{\text{m}} 56^{\text{s}}.14$ . ROSA, *Astr. Nachr.*, LVI. 348.

San Fernando . . N. Lat.  $36^{\circ} 27' 45''$ . *Corresp. Astron.*, XIV. 240.  
Long. W. from Paris,  $0^{\text{h}} 34^{\text{m}} 10^{\text{s}}.6 \pm 0^{\text{s}}.31$ . *Astr. Nachr.*, IX. 358.

Santiago . . . . (New Observatory.)  
S. Lat.  $33^{\circ} 26' 42''.0$ . } MOESTA, *Observ. Merid. rela-*  
Long. W. from Greenwich,  $4^{\text{h}} 42^{\text{m}} 42^{\text{s}}.4$ . } *tives al planeta Marte*, p. xii.  
For the original Observatory on Santa Lucia—  
S. Lat.  $33^{\circ} 26' 25''.70$ . MOESTA, *Observaciones Astronom.*, I. p. xxxvii.  
Long. W. from Greenwich,  $4^{\text{h}} 42^{\text{m}} 32^{\text{s}}.97$ . *Ibid.*, xxxix.

Sc夫tenberg . . . N. Lat.  $50^{\circ} 5' 10''.1$ . BRORSEN, *Astr. Nachr.*, xxxi. 332.  
Long. E. from Greenwich,  $1^{\text{h}} 5^{\text{m}} 50^{\text{s}}.60$ . *Ibid.*

Speyer . . . . N. Lat.  $49^{\circ} 18' 55''.4$ . SCHWERD, *Astr. Nachr.*, VI. 66.  
Long. E. from Paris,  $0^{\text{h}} 24^{\text{m}} 25^{\text{s}}.0$ . WURM, *Astr. Nachr.*, XV. 280.

Stockholm . . . . N. Lat.  $59^{\circ} 20' 33''.82$ . SELANDER, *Kongl. Vetenskaps Akad. Hand-*  
*lingar*, 1835, p. 204.  
Long. E. from Paris,  $1^{\text{h}} 2^{\text{m}} 53^{\text{s}}.33$ . SVANBERG, *Astr. Nachr.*, XI. 408.

St. Petersburg . . N. Lat.  $59^{\circ} 56' 29''.67$ . } STRUVE, *Descr. de l'Observ.*  
Long. W. from Pulkowa,  $0^{\text{h}} 0^{\text{m}} 5^{\text{s}}.194$ . } *Centrale de Poulkova*, p. 292.

- Upsala** . . . . (New Observatory.)  
 N. Lat.  $59^{\circ} 51' 31''.5$ . SCHULTZ, *Nova Acta Soc. Reg. Upsaliensis*, 1856,  
 p. 208.  
 Long. W. from Stockholm,  $1^m 43^s.70$ . THALÉN, *Ibid.*, 218.
- Utrecht** . . . . N. Lat.  $50^{\circ} 5' 10''.53$ .  
 Long. E. from Paris,  $0^h 11^m 10^s.65$ . } HOEK, *Astr. Nachr.*, LIV. 132.
- Vienna** . . . . N. Lat.  $48^{\circ} 12' 35''.5$ . *Berliner Astr. Jahrb.*, 1866, p. 295.  
 Long. E. from Paris,  $0^h 56^m 11^s.07$ . SCHUMACHER, *Astr. Nachr.*,  
 XXIII. 263.  
 For the private observatory of Mr. OPPOLZER, in the Josephstadt,  
 N. Lat.  $19''.4$  greater than } the Vienna Observatory, *Astr. Nachr.*,  
 Long.  $0^m 6^s.4$  West from } LX. 182.
- Washington** . . N. Lat.  $38^{\circ} 53' 38''.78$ . NEWCOMB, *Washington Observ.*, 1864, p. xliv.  
 Long. W. from Greenwich,  $5^h 8^m 12^s.39$ . GOULD, *Report to Coast Sur-  
 vey on Trans-Atlantic Longitudes*. (See Greenwich.)  
 The situation of the first, or provisional, Naval Observatory, in which  
 were made the observations in the first volume published by GILLISS,  
 was—  
 N. Lat.  $38^{\circ} 53' 32''.8$ . GILLISS, *Astr. Obs.*, p. viii.  
 Long.  $10^s.05$  E. of present Observatory, *C. S. Report.*, 1846, p. 72.
- Wilna** . . . . N. Lat.  $54^{\circ} 40' 59''.1$ . *Astr. Nachr.*, IV. 562.  
 Long. E. from Paris,  $1^h 31^m 50^s.31$ . *Astr. Journal*, III. 23.

## POSITIONS OF THE PRINCIPAL OBSERVATORIES.

*(North Latitudes and West Longitudes are considered as positive.)*

Place.	Latitude.	Longitude from Washington in Time.	Longitude from Washington in Days.	Longitude from Washington in Arc.
°		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>d</sup>	
Abo, . . . . .	+60° 26' 56.8	— 6 37 20.32	— .2759296	260° 39' 55.2
Albany, . . . . .	+42 39 49.5	— 0 13 12.87	— .0091767	356 41 47.0
Altona, . . . . .	+53 32 45.3	— 5 47 58.54	— .2416498	273 0 21.9
Ann Arbor, . . . . .	+42 16 48.0	+ 0 26 42.67	+ .0185494	6 40 40.0
Armagh, . . . . .	+54 21 12.7	— 4 41 36.92	— .1955662	289 35 46.8
Athens, . . . . .	+37 58 20.0	— 6 43 7.58	— .2799488	259 13 6.3
Berlin, . . . . .	+52 30 16.7	— 6 1 47.77	— .2512473	269 33 3.4
Bilk, . . . . .	+51 12 25.0	— 5 35 17.77	— .2328445	276 10 33.4
Bonn, . . . . .	+50 43 45.0	— 5 36 36.02	— .2337502	275 50 59.7
Breslau, . . . . .	+51 6 56.5	— 6 16 22.19	— .2613679	265 54 27.1
Brussels, . . . . .	+50 51 10.7	— 5 25 41.29	— .2261723	278 34 40.7
Cambridge, (Eng.), . . . . .	+52 12 51.8	— 5 8 35.06	— .2142949	282 51 13.8
Cambridge, (Mass.), . . . . .	+42 22 48.1	— 0 23 41.54	— .0164530	354 4 36.9
Cape of Good Hope, . . . . .	—33 56 3.2	— 6 22 8.09	— .2653711	264 27 58.7
Chicago, . . . . .	+41 50 1.0	+ 0 42 14.26	+ .0293317	10 33 33.9
Christiania, . . . . .	+59 54 43.7	— 5 51 6.69	— .2438274	272 13 19.6
Clinton, . . . . .	+43 3 16.5	— 0 6 35.06	— .0045727	358 21 13.8
Copenhagen, . . . . .	+55 41 13.6	— 5 58 31.05	— .2489703	270 22 14.3
Cracow, . . . . .	+50 3 50.0	— 6 28 2.80	— .2694768	262 59 18.0
Dorpat, . . . . .	+58 22 47.0	— 6 55 6.02	— .2882641	256 13 29.7
Dublin, . . . . .	+53 23 13.0	— 4 42 50.39	— .1964165	289 17 24.1
Durham, . . . . .	+54 46 6.4	— 5 1 52.64	— .2096370	284 31 50.4
Edinburgh, . . . . .	+55 57 23.2	— 4 55 29.34	— .2052007	286 7 39.9
Florence, . . . . .	+43 46 40.8	— 5 53 15.12	— .2453139	271 41 13.2
Geneva, . . . . .	+46 11 58.8	— 5 32 49.24	— .2311344	276 47 41.4
Georgetown, . . . . .	+38 54 26.2	+ 0 0 6.20	+ .0000718	0 1 33.0
Göttingen, . . . . .	+51 31 47.8	— 5 47 58.49	— .2416492	273 0 22.7
Gotha, . . . . .	+50 56 37.5	— 5 51 3.39	— .2437892	272 14 9.2
Greenwich, . . . . .	+51 28 38.2	— 5 8 12.39	— .2140323	282 56 54.2
Hamburg, . . . . .	+53 33 7.0	— 5 48 5.95	— .2417355	272 58 30.8
Helsingfors, . . . . .	+60 9 42.6	— 6 48 1.32	— .2833486	257 59 40.2
Hudson, . . . . .	+41 14 42.6	+ 0 17 32.06	+ .0121766	4 23 0.9
Kasan, . . . . .	+55 47 24.2	— 8 24 41.14	— .3504761	233 49 42.9
Königsberg, . . . . .	+54 42 50.6	— 6 30 11.87	— .2709707	262 27 2.0
Kremsmünster, . . . . .	+48 3 23.7	— 6 4 45.03	— .2532990	268 48 44.6
Leipsic, . . . . .	+51 20 6.3	— 5 57 46.87	— .2484592	270 33 17.0
Leyden, . . . . .	+52 9 20.3	— 5 26 8.57	— .2264881	278 27 51.5
Liverpool, . . . . .	+53 24 47.7	— 4 56 12.34	— .2056984	285 56 54.9
Madras, . . . . .	+13 4 9.2	—10 29 9.67	— .4369175	202 42 35.0
Mannheim, . . . . .	+49 29 12.9	— 5 42 3.06	— .2375354	274 29 14.1
Markree, . . . . .	+54 10 31.8	— 4 34 24.00	— .1905556	291 24 0.0
Marseilles, . . . . .	+43 17 49.0	— 5 29 40.55	— .2289415	277 34 51.8
Milan, . . . . .	+45 28 0.7	— 5 44 58.20	— .2395625	273 45 27.0

Place.	Latitude.	Longitude from Washington in Time.	Longitude from Washington in Days.	Longitude from Washington in Arc.
	<sup>o</sup> <sup>'</sup> <sup>"</sup>	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>d</sup>	<sup>o</sup> <sup>'</sup> <sup>"</sup>
Modena, . . . .	+44 38 52.8	— 5 51 55.53	— .2443927	272 1 7.1
Moscow, . . . .	+55 45 19.8	— 7 38 29.29	— .3183946	245 22 40.7
Munich, . . . .	+48 8 45.0	— 5 54 38.00	— .2462731	271 20 30.0
Naples, . . . .	+40 51 46.6	— 6 5 10.95	— .2535990	268 42 15.8
New York, . . . .	+40 43 48.5	— 0 12 15.47	— .0085124	356 56 8.0
Nicolajew, . . . .	+46 58 20.6	— 7 16 6.53	— .3028534	250 58 22.1
Olmütz, . . . .	+49 35 43.0	— 6 17 15.43	— .2619841	265 41 8.6
Oxford, . . . .	+51 45 35.5	— 5 3 9.79	— .2105300	284 12 33.2
Padua, . . . .	+45 24 2.5	— 5 55 41.17	— .2470043	271 4 42.5
Palermo, . . . .	+38 6 44.0	— 6 1 37.00	— .2511227	269 35 45.0
Paramatta, . . . .	—33 48 49.8	—15 12 18.64	— .6335491	131 55 20.4
Paris, . . . .	+48 50 11.0	— 5 17 33.02	— .2205211	280 36 44.7
Philadelphia, . . . .	+39 57 7.5	— 0 7 33.64	— .0052505	358 6 35.4
Prague, . . . .	+50 5 18.5	— 6 5 53.52	— .2540917	268 31 37.2
Pulkowa, . . . .	+59 46 18.1	— 7 9 31.06	— .2982757	252 37 14.1
Rome, . . . .	+41 53 53.7	— 5 58 8.53	— .2487098	270 27 52.1
San Fernando, . . . .	+36 27 45.0	— 4 43 22.42	— .1967873	289 9 23.7
Santiago, . . . .	—33 26 42.0	— 0 25 30.00	— .0177083	353 37 30.0
Senftenberg, . . . .	+50 5 10.1	— 6 14 3.00	— .2597570	266 29 15.0
Speyer, . . . .	+49 18 55.4	— 5 41 58.00	— .2374769	274 30 30.0
Stockholm, . . . .	+59 20 33.8	— 6 20 26.35	— .2641939	264 53 24.7
St. Petersburg, . . . .	+59 56 29.7	— 7 9 25.87	— .2982161	252 38 32.0
Upsala, . . . .	+59 51 31.5	— 6 18 42.70	— .2629942	265 19 19.5
Utrecht, . . . .	+50 5 10.5	— 5 28 43.67	— .2282832	277 49 5.0
Vienna, . . . .	+48 12 35.5	— 6 13 44.09	— .2595381	266 33 58.7
Washington, . . . .	+38 53 38.8	0 0 0.00	.0000000	0 0 0.0
Wilna, . . . .	+54 50 59.1	— 6 49 23.33	— .2842978	257 39 10.1

By a more recent telegraph determination, made by the *United States Coast Survey*, Cambridge, Mass., is East of Washington 0<sup>h</sup> 23<sup>m</sup> 41<sup>s</sup>.08, instead of 0<sup>h</sup> 23<sup>m</sup> 41<sup>s</sup>.54.

The correction therefore to be applied to the longitudes of the preceding table, except those of Albany, Georgetown, Hudson, New York, Philadelphia, and Washington, is +0°.46 = +0<sup>d</sup>.0000053 = +6<sup>''</sup>.9.



## ON THE ARRANGEMENT AND USE OF THE TABLES IN THIS EPHEMERIS.

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THIS Ephemeris is divided into two distinct parts. One part is designed for the special use of NAVIGATORS, and therefore adapted to the Meridian of Greenwich.

The other part is suited to the convenience of ASTRONOMERS, on this continent particularly, and adapted to the Meridian of Washington.

### THE NAUTICAL PART.

THIS part contains the Ephemeris of the sun and moon; the distances of the moon from the centres of the sun and the four most conspicuous planets, and from certain Fixed Stars; the Ephemeris of the planets Venus, Mars, Jupiter, and Saturn; and the Mean Places of 198 principal Fixed Stars for the beginning of the year 1872.

*Time.*—Astronomers make use of several different kinds of time; an explanation of the nature of which, and of the method of passing from one to another, properly precedes an explanation of the uses of the Ephemeris.

*Sidereal Time.*—Sidereal Time is measured by the daily motion of the stars, or, as it is used by astronomers, by the daily motion of that point in the equator from which the true right ascensions of the stars are counted. This point is the vernal equinox, and its hour angle is called the *Sidereal Time*. Astronomical clocks are regulated to sidereal time.

A *Sidereal Day* is the interval of time between the transit of the vernal equinox over any meridian, and its next succeeding return to the same meridian. It is divided into 24 hours. The sidereal hours are counted from 0 to 24, commencing with the instant of the passage of the true vernal equinox over the upper meridian, and ending with its return to the same meridian.

The vernal equinox is not a fixed, but a movable, point on the equator. Its motion is composed of two parts: precession, which is proportional to the time, and is combined with the daily motion of the heavens; and nutation, which is periodical. In consequence of the latter, the daily motion of the equinox is not strictly a uniform measure of time, and the sidereal time in common use might therefore be called *Apparent Sidereal Time*; and *Mean Sidereal Time* would be that reckoned from the transit of the mean equinox; but the irregularity referred to cannot exceed 2<sup>s</sup>.3 in a period of nineteen years, and is, therefore, of no practical importance.

*Solar Time.*—Solar Time is measured by the daily motion of the sun. A *Solar Day* is the interval of time between two successive transits of the sun over the same meridian; and the hour angle of the sun is called *Solar Time*. This is the most natural and direct measure of time. But the intervals between the successive returns of the sun to the meridian are not exactly equal, but depend upon the variable motion of the sun in right ascension.

The want of uniformity in the sun's motion in right ascension arises from two different causes; one, that the sun does not move in the equator, but in the ecliptic; the other, that the sun's motion in the ecliptic is not uniform.

To avoid the irregularity in time caused by the want of uniformity in the sun's motion, a fictitious sun, called a *Mean Sun*, is supposed to move in the equator with a uniform velocity.



*Mean Time*, which is perfectly equable in its increase, is measured by the motion of this *Mean Sun*; the latter at certain periods agrees with the real sun, then again is in advance of it, and at other times is behind it. The clocks in ordinary use, and chronometers used by Navigators, are regulated to *mean time*.

*True or Apparent Time* is measured by the motion of the real sun.

The difference between the *true* and *mean* time is called the *Equation of Time*. By means of it we pass from *true* to *mean* time, or the reverse. Thus, if the *true* time be given, the *mean* time corresponding to it will be obtained by adding or subtracting the equation of time, according to the precept at the head of the column in which it is found, on page I. of the Calendar. If the *mean* time be given, the *true* time is obtained by applying the equation of time as directed by the precept on page II. of the Calendar.

*Day*.—The *civil day*, according to the customs of society, commences at midnight, and comprises twenty-four hours from one midnight to the next following. The hours are counted from 0 to 12 from midnight to noon, after which they are again reckoned from 0 to 12 from noon to midnight. Thus the day is divided into two periods of 12 hours each; the first of which is marked A. M., the last is marked P. M.

The *astronomical day* commences at noon of the civil day of the same date. It also comprises twenty-four hours, but they are reckoned from 0 to 24, and from the noon of one day to that of the next following. The astronomical, as well as the civil, time may be either *apparent*, or *mean*, according as it is reckoned from *apparent* noon, or from *mean* noon.

The civil day begins twelve hours before the astronomical day; therefore the first part of the *civil day* answers to the last part of the preceding *astronomical day*, and the last part of the *civil day* to the first part of the same *astronomical day*. Thus, January 9th, 2<sup>h</sup> A. M., *civil time*, is January 8th, 14<sup>h</sup>, *astronomical time*; and January 9th, 2<sup>h</sup> P. M., *civil time*, is also January 9th, 2<sup>h</sup>, *astronomical time*. The rule, then, for the transformation of the civil time into astronomical time is this: If the civil time is marked A. M., take one from the date, and add twelve to the hours, and the result is the astronomical time wanted; if the civil time is marked P. M., take away the designation P. M., and the astronomical time is had without further change.

If the longitude be expressed in time, and, when it is *west*, added to the local time, or, when it is *east*, subtracted from the local time, the result is the corresponding Greenwich time. If the local astronomical time is used, the result is the *Greenwich astronomical time*, which ordinarily is required for the use of this Part of the Ephemeris.

**THE CALENDAR.**—The Calendar is divided into twelve months, and to each month are assigned eighteen pages, of which the contents are as follows:

Page I. contains the *Apparent Right Ascension and Declination* of the Sun and the *Equation of Time* for each Greenwich *apparent* noon. Adjoining columns contain the differences of these quantities for one hour. By multiplying this difference by the hours and parts of an hour from Greenwich *apparent* noon, and adding the amount to, or subtracting it from, the quantity at noon, according as that quantity is increasing or decreasing, we obtain the value of the quantity for a given *Greenwich apparent time*. The hourly differences are given for the instant of *apparent* noon at Greenwich, and, when great accuracy is required, should be first interpolated for *half* the hours and parts of an hour of the Greenwich *apparent* time.

This page is chiefly used when the sun is observed on the meridian, and the local *apparent* time is 0. The longitude from Greenwich expressed in time, if *west*, is at that instant the Greenwich *apparent* time, or time *after* Greenwich *apparent* noon;—if *east*, it is time *before* Greenwich *apparent* noon;—and may be employed in reducing the quantities on this page to *apparent* noon at any place.

The Right Ascension of the sun thus reduced is the *Sidereal Time of Local Apparent Noon*. The difference between it and the clock time of the meridian passage of the sun is the error of the clock on *sidereal* time.

The Declination of the sun reduced to the meridian, or apparent noon, of the place, is needed in finding the latitude from a meridian altitude of the sun.

As an example of the use of this page, let the sun's declination be required at noon of Sept. 3d, 1872, in longitude  $146^{\circ} 4' W.$ , or  $+9^h 44^m 16^s$ . We first find—

For Sept. 3d, at Greenwich *apparent* noon,  $\odot$ 's declination  $= 7^{\circ} 21' 16.9'' N.$

The diff. for 1 hour, $+55''.30$ , multiplied by 9, is	497.70
The proportional part for $30^m = \frac{1}{2}^h$ ,	27.65
" " " $12^m = \frac{1}{4}^h$ ,	11.06
" " " $2^m = \frac{1}{30}^h$ ,	1.84
" " " $15^s = \frac{1}{4}$ of $2^m$ ,	23

The sum to be subtracted,  $538.46$  or  $8^{\circ} 58'.5''$ .

The sun's declination required,  $7^{\circ} 12' 18.4'' N.$

The longitude  $9^h 44^m 16^s = 9^h 44^m 27^s = 9^h.738$ ; and  $55''.30 \times 9.738 = 538''.51 = 8^{\circ} 58''.51$ ; which is also the reduction obtained in another way.

If the longitude is  $146^{\circ} 4' E.$ , the reduction,  $8^{\circ} 58''.5$ , should be added, and the resulting declination becomes  $7^{\circ} 30' 15''.4 N.$

If greater precision is required, the hourly difference may be first interpolated for  $4^h 52^m$  *after* noon for the *west* longitude, or for  $4^h 52^m$  *before* noon for the *east* longitude. This will give, in the first case, the hourly difference  $55''.36$ , and the resulting declination  $7^{\circ} 12' 17''.8 N.$ ; and, in the second case, the hourly difference  $57''.48$ , and the declination  $7^{\circ} 30' 14''.8 N.$

At sea, however, it is ordinarily sufficient to have the declination to the nearest half minute; and the reduction may be found by Table V. of Bowditch's *American Practical Navigator*.

The *Equation of Time*, as has been before explained, is the number of minutes and seconds to be added to or subtracted from the *apparent* time, or the time given by an observation of the sun, to obtain the *mean* time. The heading of the column directs the manner in which the equation is to be applied. Where there is a change in the course of the month from addition to subtraction, or the reverse, as in the months of April and June, the two different directions are separated by a line, while a corresponding line below points out the date at which the change takes place. As given on page I. the equation of time is also the *mean* time of *apparent* noon.

On page I. are also given the *Sun's Semidiameter*, which is used in reducing the altitude of a limb of the sun, or the angular distance of the limb from the moon or some other object, to the altitude, or distance, of the centre of the sun; and the *Sidereal Time of the Semidiameter passing the Meridian*, which is employed in obtaining the passage of the sun's centre over the wires of a transit-instrument, when the passage of one limb only has been observed. The quantity found in this column is to be added to the time of transit of the *first*, or western, limb, to be subtracted from the time of transit of the *second*, or eastern, limb.

Page II. contains for each Greenwich *mean* noon the *Apparent Right Ascension* and *Declination of the Sun*, the *Equation of Time*, and the *Sidereal Time of Mean Noon*. The hourly changes of these quantities are also given for noon, and may be used in reducing them to any given Greenwich *mean* time. The hourly changes may be first interpolated for half the Greenwich time, when great precision is required.

The Right Ascension and Declination on pages I. and II. are affected by *Aberration*, and therefore denote the *apparent* position of the *true* sun. Page II. is more conveniently used when the *mean* time is known. This is the case in most observations of the sun out of the meridian, when the times have been noted by a clock or chronometer regulated to *mean* time. The quantities can be reduced to mean noon of any place by interpolating for the longitude, as in the example of the sun's declination on the preceding page.

The sun's declination is required for finding the latitude of the place, the local time, and the sun's azimuth and amplitude, from observations of the sun.

The equation of time is needed in finding the local time from observations of the sun, and the latitude from other than meridian observations. The heading of the column directs the manner in which it is to be applied to *mean* time to obtain the *apparent* time.

As given on page II., the equation when *additive* is the apparent time of mean noon; and in general it is the hour angle of the *true* sun at the instant of *mean* noon.

The *Sidereal Time of Mean Noon* is also the *Right Ascension of the Mean Sun*. It may be reduced for the longitude, or to any Greenwich *mean* time, by using the hourly difference,  $9^s.8565$ ; or by Table III. in the appendix of the *American Ephemeris* for *reducing intervals of mean solar to sidereal time*. Table LI. of Bowditch's *Navigator* may be used for the same purpose when the nearest quarter of a second only is required.

The sun's right ascension and the sidereal time of mean noon, or right ascension of the mean sun, are useful in converting solar time to sidereal time. If we add the right ascension of the *true* sun to the *apparent* time, or the right ascension of the *mean* sun to the *mean* time, the result will be the *sidereal* time.

The sidereal time of mean noon is also used in converting sidereal time to mean time, by first reducing it for the longitude of the place. Subtracting the reduced value from the given sidereal time, gives the interval of sidereal time from noon. Subtracting from this the corresponding reduction of a *sidereal interval to a mean time interval* in Table II. of the *American Ephemeris*, or Table LII. of Bowditch's *Navigator*, will give the mean time required. This reduction may also be found by multiplying  $9^s.8296$  by the hours and parts of an hour of the given *sidereal* time.

As examples of the use of page II. :—

1. Let the sun's right ascension and the equation of time be required for 1872, Sept. 5, 6<sup>h</sup> 12<sup>m</sup> 13<sup>s</sup> A. M. mean time at a place whose longitude is  $118^{\circ} 14' E$ .

The local astronomical mean time is		Sept. 4, 18 <sup>h</sup> 12 <sup>m</sup> 13 <sup>s</sup>
The longitude in time,		— 7 52 56
The Greenwich mean time,		Sept. 4, 10 19 17
		or Sept. 4, 10.3214
	Sun's R. A.	Equation of time.
Sept. 4, Noon,	10 54 24.08	1 14.88 Additive.
H. D. $9^s.038 \times 10.3214$	+ 1 33.28	H. D. + $0^s.818 \times 10.3214 = + 8.44$
	10 55 57.36	1 23.32

If greater precision is required, the hourly differences interpolated to  $5^h.2$ , or  $9^s.036$  for the right ascension, and  $0^s.820$  for the equation of time, should be used.

The equation of time in this example is *additive* to mean time. Its reduction could have been found by Table VI. A. of Bowditch's *Navigator* to seconds only.

2. If the sidereal time is required for the same date and time, we have—

Sept. 4, Noon, the R. A. of the mean sun is	10 55 38.96
Add the H. D. $9^s.8565 \times 10.3214$ , or	+ 1 41.73
Add the local astronomical mean time	18 12 13.00
The required sidereal time, rejecting 24 <sup>h</sup> , is	5 9 33.69

The reduction  $1^m 41^s.73$  could have been found in Table III. corresponding to the Greenwich mean time, 10<sup>h</sup> 19<sup>m</sup> 17<sup>s</sup>. By Table LI. of Bowditch's *Navigator*, the reduction is  $1^m 41^s.7$ .

3. 1872, Sept. 5, A. M., at a place whose longitude is  $118^{\circ} 14' E.$ , suppose the sidereal time to be  $5^h 9^m 33^s.69$ , and that the corresponding mean time is required.

The astronomical day is Sept. 4; the longitude in time  $-7^h 52^m 56^s$ , or  $-7^h.882$ .

Sept. 4, the sidereal time of Greenwich mean noon is	$\begin{smallmatrix} h & m & s \\ 10 & 55 & 38.96 \end{smallmatrix}$
The H. D. $9^s.8565 \times (-7.882)$ , or the red. for $7^h 52^m 56^s$ in Table III.	$- 1\ 17.69$
The sidereal time of local noon,	$\begin{smallmatrix} 10 & 54 & 21.27 \\ \hline 29 & 9 & 33.69 \end{smallmatrix}$
The given sidereal time $+ 24^h$ ,	
Subtracting the first from the second gives the <i>sidereal interval</i> from noon	$\begin{smallmatrix} 18 & 15 & 12.42 = 18^h.254 \\ \hline - 9^s.8296 \times 18.254, \text{ or the red. for } 18^h 15^m 12^s \text{ in Table II.,} \\ \hline - 2\ 59.42 \end{smallmatrix}$

The required mean time,

Sept. 4, 18 12 13.00

Page III. contains the *Longitude and Latitude of the Sun*, and the *Logarithm of its Distance from the Earth*, at Greenwich Mean Noon of each day. The Longitude is given in two columns, headed  $\lambda$  and  $\lambda'$ ; of which,  $\lambda$ , is the sun's longitude counted from the true equinox of the date; and  $\lambda'$  is the same coördinate counted from the mean equinox of the beginning of the year. A column of hourly differences enables the computer to obtain the sun's longitude for any hour from noon. The hourly differences of the logarithm of the radius vector are likewise given. The longitudes of the sun are the true longitudes, not affected by aberration. The latitude is referred to the ecliptic of the date.

The last column on page III. contains the *Mean Time of Sidereal*  $0^h$ , or  $24^h$ —the right ascension of the mean sun. It may be reduced to any meridian by interpolating for the longitude, or to any Greenwich *sidereal* time by means of the hourly difference,  $-9^s.8296$ . The reduction, however, can be taken directly from Table II. of the American Ephemeris, for *reducing intervals of sidereal time to mean solar time*, or approximately Table LII. of Bowditch's *Navigator*.

This column is used in converting sidereal time to mean time. As an illustration let us take Example 3, above.

Sept. 4, the mean time of Greenwich sidereal $0^h$ is	$\begin{smallmatrix} h & m & s \\ 13 & 2 & 12.54 \end{smallmatrix}$
The H. D. $-9^s.8296 \times (-7.882)$ , or the red. for long., Table II.,	$+ 1\ 17.48$
The mean time of local sid. $0^h$ ,	$\begin{smallmatrix} 13 & 3 & 30.02 \\ \hline 5 & 9 & 33.69 = 5^h.159 \end{smallmatrix}$
Add the given sidereal time,	
The sum is	$\begin{smallmatrix} 18 & 13 & 3.71 \\ \hline - 9^s.8296 \times 5.159, \text{ or the red. for } 5^h 9^m 34^s \text{ in Table II.,} \\ \hline - 50.71 \end{smallmatrix}$

The required mean time,

Sept. 4, 18 12 13.00

It was readily seen in advance that the sum of the mean time of sidereal  $0^h$  and the given sidereal time would be less than  $24^h$ . Were it more than  $24^h$ , the mean time of sidereal  $0^h$  should be taken out for Sept. 3, that is the *preceding* astronomical day.

Page IV. contains the *Moon's Semidiameter* and *Equatorial Horizontal Parallax* for every mean noon and midnight at Greenwich. Columns adjoining those of the Horizontal Parallax give the change of this quantity in one hour, by means of which it can be reduced to any other Greenwich mean time in the same way as the sun's declination and the equation of time in the preceding examples. The sign *plus* or *minus* (+ or -) prefixed to the hourly differences, shows whether the horizontal parallax is increasing or decreasing.

The reduction of the moon's semidiameter may be readily found from the reduction of the horizontal parallax, by multiplying it by 0.273. It also may be obtained from Table XI. of Bowditch's *Navigator*, or by simply computing the proportional part.

If, for example, the semidiameter of the moon is to be taken out for 1872, July 17, 9<sup>h</sup> P. M. Greenwich mean time, we see that the difference of the semidiameters at noon and midnight of Nov. 18 is  $6''.4$ ; then

$$\text{as } 12^h : 9^h = 6''.4 : 4''.8$$

which is the correction to be *added* to the semidiameter at noon, because the semidiameter is *increasing*. The moon's semidiameter, then, for July 17, 9<sup>h</sup>, is  $16' 22''.8 + 4''.8$ , or  $16' 27''.6$ .

The moon's semidiameter and horizontal parallax are required for all observations of the moon. When great precision is needed, the hourly differences should be first interpolated for *half* the interval of Greenwich time from noon or midnight, and a correction applied to the horizontal parallax for the latitude of the place of observation.

The *Mean Time of the Moon's Meridian Passage* at Greenwich, which is given on page IV. to minutes and tenths of minutes, is also accompanied with a column of differences for one hour of longitude, by means of which, having the longitude turned into time, the time of the moon's meridian passage at any other place may be computed. The reduction may be taken from BOWDITCH'S Table XXVIII. by simple inspection. The last column of this page contains the *Age* of the Moon, or the time elapsed since the preceding new moon, to tenths of days.

Pages V. to XII., inclusive, contain the *Moon's Right Ascension* and *Declination* for each day and hour of Greenwich mean time. They are accompanied with columns of *differences for one minute*, which are also given at each hour. The right ascension and declination of the moon change so rapidly, that, if they were not given at frequent intervals, the moon would cease to be useful to the practical navigator as a means of determining the latitude and time. These quantities are wanted for Greenwich mean time, which is either taken directly from a well-regulated chronometer, or is obtained by applying the longitude, turned into time, to the local mean time of the observer. Each is taken out for the day and hour of the Greenwich mean time; the *diff. for 1<sup>m</sup>* multiplied by the *minutes* and parts of a minute of the Greenwich time; and the product added to, or subtracted from, the quantity, according as the quantity is increasing or decreasing.

Thus, suppose the moon's right ascension and declination are required for 1872, April 8, 15<sup>h</sup> 15<sup>m</sup> 20<sup>s</sup>, astronomical mean time at Greenwich:

	<i>Right Ascension.</i>			<i>Declination.</i>		
	<sup>h</sup>	<sup>m</sup>	<sup>s</sup>	<sup>°</sup>	<sup>'</sup>	<sup>"</sup>
April 8, 15 <sup>h</sup>	2	8	8.60	9	25	19.3 N.
Diff. 2°.0257 × 15.333	+ 31.06			13".106 × 15.333°		
				3 21.0 N.		
April 8, 15 <sup>h</sup> 15 <sup>m</sup> 20 <sup>s</sup>	2	8	39.66	9	28	40.3 N.

The differences interpolated for 7<sup>m</sup>.67 = 0<sup>h</sup>.13 are for the right ascension 2°.0256, and for the declination 13".099, which may be used for greater precision.

Page XII. contains also the *Phases of the Moon* and the dates of the *Moon's Perigee and Apogee*, or least and greatest distances from the earth.

Pages XIII. to XVIII., inclusive, contain the *Lunar Distances*, or the angular distances of the centre of the moon from the centre of the sun, the four larger planets, and certain fixed stars, as they would appear to an observer at the centre of the earth. They are given for every third hour of Greenwich mean time, beginning at noon; the dates are therefore *astronomical*. All the distances that can be observed on the same day are grouped together under that date; and the columns are read from left to right, across both pages of the same opening. The letter W., or E., is affixed to the name of the sun, planet, or star, to indicate that it is on the west, or east, side of the moon.

An observer on the earth's surface having measured a *Lunar Distance*, corrected it for errors of his instrument and for the semidiameter of the objects, and cleared it from the effects of refraction and parallax, finds the *true*, or *geocentric*, distance. With this distance and the distances in the Ephemeris of the same bodies on the same day, the *Greenwich mean time* of the observation can be found.

To lessen the labor of computation, there is given in the Ephemeris between every two successive distances the *logarithm of the seconds of time in which the distance changes 1"*, or, as it is usually called, the *proportional logarithm of the difference*. It is given for the *middle instant* of the two dates between which it is placed.

For computing the *Greenwich time* we have the following rule:

Find in the Almanac the two distances between which the true distance falls; take out the nearest of these, the hours of Greenwich time over it, and the *P. L. of Diff.* between them:

Find the difference between the true distance and the distance taken from the Almanac; and from the *proportional logarithm* of this difference subtract the *P. L. of Diff.* taken from the Almanac:

The result is the *proportional logarithm* of an interval of time to be *added* to the hours of Greenwich time, taken from the Almanac, when the *earlier* Almanac distance is used; to be *subtracted* from the hours of Greenwich time, when the *later* Almanac distance is used.

Or, we may *add* the *common logarithm* of the difference of the true and the Almanac distances to the *P. L. of Diff.* of the Almanac; and the sum will be the *common logarithm* of the correction to be applied to the hours of Greenwich time. The Table of *Logarithms of small Arcs in Space or Time*, given at the end of the volume for 1871, saves the operation of reducing degrees (or hours) and minutes to seconds, and the reverse.

As the *P. L. of Diff.* in the Ephemeris varies, the Greenwich time, found by the methods just described, may not be sufficiently exact. To correct it for such variation, or *2d difference*, take the difference between the *P. L. of Diff.* used and the one which follows it in the Ephemeris, (or, more strictly, half the difference of the preceding and following ones.) With this difference, and the first correction of the Greenwich time already found, enter Table I. Appendix, and take out the corresponding seconds, which are to be *added* to the approximate Greenwich time if the *Prop. Logs.* in the Ephemeris are *decreasing*; to be *subtracted* if they are *increasing*.

Thus the *Greenwich mean time* of the observation can be obtained. If the observer has noted the time of observation by a chronometer, the difference of this chronometer time and the Greenwich mean time will be the *error* of the chronometer as found from the Lunar Distance. The agreement or disagreement of this error with that brought up from the error and rate of a previous date, may show whether the chronometer has run well or ill. In this way Lunar Distances can be used as a check upon the chronometer. By a series of carefully observed Lunar Distances on both sides of the moon, the chronometer error can be tolerably well ascertained.

If the observer has found the *local mean time* of observation from the observed altitude of one of the bodies, or by a watch regulated to that time by recent observations and corrected for change of longitude in the interval, the difference of this local time and the Greenwich time found from the Lunar Distance will be his longitude.

As an example of finding the Greenwich mean time from a Lunar Distance, suppose that on 1872, Jan. 26, about 16<sup>h</sup> of Greenwich astronomical time, the corrected distance of the moon's centre from  $\alpha$  Tauri (*Aldebaran*) is  $73^{\circ} 17' 43''$ :

Corrected distance,	$75^{\circ} 17' 43''$		
Distance in the Ephemeris, Jan. 26, 15 <sup>h</sup> 0 <sup>m</sup> 0 <sup>s</sup>	$74^{\circ} 42' 31''$	P. L.	.2955
Difference,	$35^{\circ} 12'$	P. L.	.7087
Time from 15 <sup>h</sup> ( <i>after</i> )	+ 1 9 31	P. L.	.4132
Corr. for 2d Diff., Table I.,	+ 2	Diff. of P. Logs.	— 6
Greenwich Mean Time, Jan. 26	16 9 33		

By a Table of common logarithms, or a Table of logarithms of small arcs, the reduction of the Greenwich time would be found thus:

P. L. from Ephemeris,			0.2955
Diff. of distances,	$35' 12'' = 2112''$	log	3.3247
Red. of Greenwich time, + 1 <sup>h</sup> 9 <sup>m</sup> 31 <sup>s</sup> = 4171 <sup>s</sup>		log	3.6202

the result being the same as by the previous method.

Pages 218 to 241, inclusive, contain the Ephemerides of the four principal planets, Venus, Mars, Jupiter, and Saturn. The Ephemeris of each consists of its *apparent right ascension and declination*, and their *variations in one hour*, for each Greenwich mean noon; the *mean time of meridian passage*; and, at the bottom of the page, the *semidiameter* and *horizontal parallax*.

North declinations are marked +, south declinations —. + prefixed to the hourly change of declination of the sun, moon, or a planet, indicates that north declinations are increasing, and south declinations are decreasing; — indicates that north declinations are decreasing, south declinations increasing.

The right ascension and declination are needed in all observations of the planet for time, latitude, or azimuth. The mode of reducing them to any instant of Greenwich mean time is the same as in the examples of the sun previously given. The mean time of passage across any meridian can be found by dividing the *daily* difference by 24, and using the *hourly* difference thus obtained, as in the case of the moon; or, the reduction can be found by the proportion: As  $24^h$  (or  $360^\circ$ ) is to the longitude, so is the daily difference to the reduction required.

Pages 242 to 244 contain the SUN'S *Rectangular Coördinates* referred to the equator and equinox of the date. They were employed in computing the Ephemeris of the Planets. The day of the year, or number of days from January 0, is also given.

Pages 245 to 248 contain the MOON'S *true Longitude and Latitude* for each Greenwich mean noon and midnight. The right ascensions and declinations of the moon have been computed from them.

Pages 261 to 264 contain the *Mean Places*, with their *annual variations*, of one hundred and ninety-eight Fixed Stars for the beginning of the year 1872. North declinations are marked +; south declinations —.

The right ascension of a star is also the *sidereal time* of its meridian passage. From this we may roughly find the mean time of meridian passage by adding the *mean time of sidereal 0<sup>h</sup>* on page III. of the Calendar, or subtracting the *sidereal time of mean noon* on page II., (disregarding seconds;) but we can find it more exactly by the processes already given for converting sidereal time to mean time.

The right ascension and declination of a star are generally needed in observations of it for time, latitude, or azimuth. The mean places are sufficiently accurate for most observations at sea; but for more exact observations, the *apparent places* given in the larger Ephemeris should be used.

## THE ASTRONOMICAL PART.

This part is adapted to the meridian of Washington; and Washington time, *astronomical* or *sidereal*, is required in its use. The longitude of Washington from Greenwich is assumed to be  $+5^h 8^m 12^s$ .

*Obliquity of the Ecliptic, &c.*, page 250.—This page contains for every ten days of the year the *Apparent Obliquity*, which is required for the transformation of longitudes and latitudes to right ascensions and declinations, or the reverse; the *Equation of Equinoxes* in longitude and right ascension, or the reduction from the *mean* to the *true* equinox of the date; the *Precession of Equinoxes* in longitude, or the reduction of longitudes from the mean equinox of the *beginning* of the year to the mean equinox of the *date*; the *Sun's Aberration*, which is to be applied to the *true* longitude of the sun, as given in the Ephemeris, to obtain its *apparent* longitude; the *Sun's Horizontal Parallax*; and the *Mean Longitude of the Moon's Ascending Node*.

At the bottom of the page are given the *Mean Obliquity* for the beginning of the year; the *Annual Precession* for the middle of the year, the precession in a sidereal and in a solar day, and the *daily motion* of the moon's node in longitude.

*Fixed Stars.*—Pages 251–259 contain for each mean midnight the logarithms of *A*, *B*, *C*, *D*, also *f*, *G*, *H*, *i*, and logarithms of *g*, *h*, and *i*, (following BESSEL's notation), for reducing the *mean* places of the Fixed Stars at the beginning of the year to their *apparent* places on any day.

The formulæ from which they are derived, and those in which they are used, are given on page 260. The coefficients are those of PETERS and STRUVE. For terms in right ascension, except the small terms at bottom of page 260, they are expressed in time.

The first set of quantities require for the star the logarithms of *a*, *b*, *c*, *d*, *a'*, *b'*, *c'*, *d'*, which are to be found in the Star Catalogues. The other set require no other star constants than the right ascensions and declinations. *f*, *G*, and *H* are given in time, as well as arc, to facilitate their use with tables of sines, &c., which have the argument in time.

Tables IV., V., and VI., in the Appendix, give corrections of the apparent places of several circumpolar stars, and of the quantities *A* and *B* for small terms of nutation.

For a star near the pole, it is best to compute the reductions with the time constants and the mean right ascension and declination at the date, instead of the beginning of the year, (or the logarithms of *a*, *b*, *c*, &c., reduced to the date), and add such of the following terms as may be of sufficient magnitude:

In Right Ascension.	In Declination.
$+0s.000003 \tau^2 \sin a \} \tan \delta$	$+0''.000975 \tau^2 \sin^2 a$
$-0s.000149 \tau^2 \cos a \} \tan \delta$	$-0''.000023 \cos 2 \Omega$
$-0s.0000650 \tau^2 \sin 2 a \} \tan^2 \delta$	$-0''.000080 \cos 2 \Omega \cos 2 a$
$+0s.0000103 \sin 2 \Omega \cos 2 a \} \tan^2 \delta$	$-0''.000077 \sin 2 \Omega \sin 2 a$
$-0s.0000107 \cos 2 \Omega \sin 2 a \} \tan^2 \delta$	$+0''.000040 \cos 2 \Omega \cos 2 a$
$+0s.0000620 \sin 2 \Omega \cos 2 a \} \sec^2 \delta$	$-0''.000467 \cos 2 \Omega \cos 2 a$
$-0s.0000622 \cos 2 \Omega \sin 2 a \} \sec^2 \delta$	$-0''.000465 \sin 2 \Omega \sin 2 a$
$+0s.0000513 \sin (\odot + \Omega) \cos 2 a \} \tan \delta \sec \delta$	$-0''.00004 \cos (\odot + \Omega)$
$-0s.0000507 \cos (\odot + \Omega) \sin 2 a \} \tan \delta \sec \delta$	$-0''.00038 \cos (\odot + \Omega) \cos 2 a$
$+0s.0000097 \sin (\odot - \Omega) \cos 2 a \} \tan \delta \sec \delta$	$-0''.00038 \sin (\odot + \Omega) \sin 2 a$
$-0s.0000053 \cos (\odot - \Omega) \sin 2 a \} \tan \delta \sec \delta$	$-0''.00038 \cos (\odot - \Omega)$
	$-0''.00004 \cos (\odot - \Omega) \cos 2 a$
	$-0''.00007 \sin (\odot - \Omega) \sin 2 a$

Pages 261–264 contain the *mean places* and their *annual variations* of 198 Fixed Stars for 1872, Jan.  $0^h +.320$ , or the instant when the sun's mean longitude was  $280^\circ$ .  $\tau$  on the preceding pages is reckoned from the same epoch. Stars within  $25^\circ$  of either pole are designated by a \*.



The *apparent* places of  $\alpha$ ,  $\delta$ , and  $\lambda$  Ursæ Minoris, and of 51 Cephei, are given on pages 265–276 for every upper transit at Washington. They include the terms depending on  $2\text{C}$ , as well as other small terms on pages 260 and 505, so far as they were of sufficient importance.

The *apparent* places of the remaining 194 stars follow on pages 277–325 in the order of their right ascensions. They are given for every tenth transit, together with *ten times* their *daily* motion at transit; and include all terms of the preceding formulæ exceeding  $0^{\circ}.003$  in right ascension, or  $0''.03$  in declination, except those which depend on  $2\text{C}$  and  $\text{C} - \text{IV}$ . The mean solar time of transit is also given to the nearest tenth of a day.

*Solar Ephemeris.*—Pages 326–331 contain the *Apparent Right Ascension* and *Declination* of the SUN for each mean and apparent noon at Washington; the *Hourly Motion* at mean noon; the *Equation of Time* at apparent noon with the sign of its application to apparent time; the SUN's *Semidiameter* and the *Sidereal Time of its passing the Meridian*; and the *Sidereal Time of Mean Noon*. The explanation of these quantities and their use has already been given on pages 496–498.

The SUN's *Horizontal Parallax* is on page 250.

*Moon Culminations.*—Pages 332–334 contain the mean solar time of the *Upper Transit* of the MOON's *centre* at Washington, expressed to hundredths of a minute, the *difference* for *one hour* of longitude, and the *Sidereal Time of Semidiameter passing the Meridian*, both given for the instant of transit at Washington. The numbers in the fifth column indicate the four STARS in the list of *Moon Culminating Stars*, pages 335–338, the two preceding and the two next following the moon, proper to be observed with the moon at each transit. The *bright Limb* of the *Moon* is indicated by the Roman numerals in the last column.

The time of transit at any place, within six hours of Washington in longitude, may be found with sufficient accuracy from the time of the Washington transit by using the hourly difference interpolated for a longitude *half* that of the given place. With this time, reduced to Greenwich time, the moon's right ascension can be taken from the Lunar Ephemeris, pages V–XII of each month, as in the example on page 502. If greater precision is required, or the place is more than six hours from Washington, we may from the right ascension thus obtained, which is nearly the *local sidereal time*, find the *local mean time* (as on page 501) more accurately than before, and thence the *Greenwich mean time*, and with this revise the computation.

As an example, suppose the right ascension of the bright limb of the moon to be required at the transit of April 17, 1872, at Chicago, in longitude

W. from Washington,  $0^{\text{h}} 42^{\text{m}} 14^{\text{s}} = 0^{\text{h}}.704 = 0^{\circ}.0293$ .

W. from Greenwich,  $5^{\text{h}} 50^{\text{m}} 26^{\text{s}}$ .

Transit at Washington, (p. 332) . . . . .	April 17, <sup>h</sup> 7 <sup>m</sup> 56.77
Hourly motion, . . . . .	$1^{\text{m}}.938 \times 0.704 = + 1.36$
Transit at Chicago, . . . . .	April 17, <sup>h</sup> 7 <sup>m</sup> 58.13
Longitude from Greenwich . . . . .	5 50.43
Greenwich mean time . . . . .	April 17, <sup>h</sup> 13 <sup>m</sup> 48.56
April 17, <sup>h</sup> 14 <sup>m</sup> (p. 64), Moon's R. A. . . . .	<sup>h</sup> 9 <sup>m</sup> 44 <sup>s</sup> 28.64
Diff. for $1^{\text{m}}$ . . . . .	$- 11.44 \times 2.0407 = - 23.34$
April 17, <sup>h</sup> 13 <sup>m</sup> 48.56, Moon's R. A. . . . .	<sup>h</sup> 9 <sup>m</sup> 44 <sup>s</sup> 5.34
Sid. time of semidiam. passing, (p. 332) . . . . .	$- 1 5.55$
R. A. of I, or bright limb, at its transit at Chicago . . . . .	<sup>h</sup> 9 <sup>m</sup> 42 <sup>s</sup> 59.79
The approximate Declination is $+ 18^{\circ} 42'$ .	

The above hourly motion,  $1^{\text{m}}.938$  is found by interpolating *forward*  $0^{\circ}.015$  from that given on p. 332; and  $2.0407$ , the change of right ascension in  $1^{\text{m}}$ , by interpolating  $6^{\text{m}}$  *back* of that given on p. 64 for

April 17, 14<sup>h</sup>. The time of semidiameter passing the meridian is interpolated *forward* 0<sup>m</sup>.029 from that given on p. 332, and is subtracted from the right ascension of the centre, since the bright limb is I., or the preceding one.

The Greenwich mean time computed from the right ascension of the moon's centre is 0<sup>m</sup>.01 less, and the revised right ascension 0<sup>m</sup>.02 greater, than those stated above.

*Moon Culminating Stars*, pages 335–338.—The *mean* places, with their annual variations, of 174 stars near the moon's path are given for the beginning of the fictitious year (1872, Jan. 0<sup>d</sup>+.320). The names of 35 of them, whose *apparent* places are given in the Ephemeris of the *Fixed Stars*, are printed in SMALL CAPITALS.

The *apparent* places of the others may be obtained by the quantities and formulæ on pages 251–260. To illustrate the use of these, suppose the apparent place of No. 68,  $\pi$  Leonis, one of the four stars proper to be observed with the moon on the 17th April, be required at its transit of that date at Chicago.

The Washington mean time of transit is April 17, 8<sup>h</sup>.7. The quantities from page 251, or page 255, are to be taken for a date 3<sup>h</sup>.3=0<sup>d</sup>.14 *before* midnight of April 17, for which they are there given.

## 1st Method.

(Star Tables)	log $a$	0.5023	log $b$	7.9366 $\pi$	log $c$	8.7590 $\pi$	log $d$	8.5487
(p. 251)	log $A$	8.7099 $\pi$	log $B$	0.4431 $\pi$	log $C$	1.2179 $\pi$	log $D$	0.9865 $\pi$
(Star Tables)	log $a'$	1.2323 $\pi$	log $b'$	9.7198 $\pi$	log $c'$	9.5440	log $d'$	9.1077 $\pi$
	log $Aa$	9.2123 $\pi$	log $Bb$	8.3797	log $Cc$	9.9769	log $Dd$	9.5352 $\pi$
	log $Aa'$	9.9422	log $Bb'$	0.1629	log $Cc'$	0.7619 $\pi$	log $Dd'$	0.0942
(p. 236)	$a = 9^{\circ} 53' 26.99''$			$\delta = + 8^{\circ} 39' 25.9''$				
	$Aa = - 0.163$			$Aa' = + 0.88$				
	$Bb = + 0.024$			$Bb' = + 1.45$				
	$Cc = + 0.948$			$Cc' = - 5.78$				
	$Dd = - 0.343$			$Dd' = + 1.94$				
	$E = - 0.003$			$\mu' = - 0''.03$				
	$\mu = + 0.002$			$\tau\mu = + 0.001$				
	<i>Apparent Place, <math>a' = 9^{\circ} 53' 27.45''</math></i>			$\delta' = + 8^{\circ} 39' 23.7''$				

## 2d Method.

(p. 336)	$a = 9^{\circ} 53.5'$		$\delta = + 8^{\circ} 39.4'$	
(p. 255)	$G = 16^{\circ} 38.7'$		$G + a = 2^{\circ} 32.2' = 38^{\circ} 2'$	
"	$H = 15^{\circ} 58.4'$		$H + a = 1^{\circ} 51.9' = 27^{\circ} 57'$	
log $\frac{1}{r}$	8.8239	log $\frac{1}{r}$	8.8239	$a = 9^{\circ} 53' 26.99''$
log $g$	0.4711	log $h$	1.2821	$f = - 0.160$
l. sin ( $G + a$ )	9.7896	l. sin ( $H + a$ )	9.6709	$(g) = + 0.018$
l. tan $\delta$	9.1826	l. sec $\delta$	0.0050	$(h) = + 0.605$
log ( $g$ )	8.2672	log ( $h$ )	9.7819	$\tau\mu = + 0.001$
<i>Apparent Right Ascension</i>				$a' = 9^{\circ} 53' 27.45''$
log $g$	0.4711	log $h$	1.2821	
l. cos ( $G + a$ )	9.8963	l. cos ( $H + a$ )	9.9461	$\delta = + 8^{\circ} 39' 25.9''$
log ( $g'$ )	0.3674	l. sin $\delta$	9.1776	$(g') = + 2.33$
log $i$	0.8552 $\pi$	log ( $h'$ )	0.4058	$(h') = + 2.55$
l. cos $\delta$	9.9950			$(i) = - 7.08$
log ( $i$ )	0.8502 $\pi$			$\tau\mu' = - 0.01$
<i>Apparent Declination</i>				$\delta' = + 8^{\circ} 39' 23.7''$

The MOON'S *Semidiameter* and *Equatorial Horizontal Parallax* for each mean noon and midnight are on pages 339–342.\* In the moon's Ephemeris, as in that of the sun, the hourly motions belong to the instant for which they are given. The hourly motion of semidiameter is equal to .2723 times that of the horizontal parallax.

\* For eclipses and occultations, BURCHARDT'S value of the semidiameter, which is 2<sup>m</sup>.5 less, is preferred.

The times of the *Moon's Phases, Apogee, Perigee, and greatest Libration*, are given on page 343; and the position of the *Moon's Equator* and the *Moon's mean longitude* on page 344; and a Table for computing the *Libration* of the Moon on page 345.

The *Ephemerides of the seven principal Planets* (pages 346–387) are given both for *mean noon* and the time of *transit*. The *hourly differences* are also given for the same instants. Third differences were used in their computation.

The *Horizontal Parallaxes, Vertical Semidiameters and Sidereal Times of the Semidiameters passing the Meridian* are on pages 388 and 389.

The *Sun's Coördinates* (pages 390–401) are given for each mean noon and midnight, referred to the apparent equinox and equator, and also to the mean equinox and equator at the beginning of the year (Jan. 0<sup>d</sup>.0). In the case of the rectangular coördinates, only the last four decimals are given for the mean equinox and equator, and the first three places are to be taken from the apparent equinox and equator. When a change of a unit is to be made in the third place, it is indicated by a corresponding colon (:). The latitude is referred to the ecliptic of the date. The reduction to the mean ecliptic of Jan. 0. is  $+0''.488 \tau \sin (\odot + 187^\circ)$ , in which  $\tau$  is the time from Jan. 0, in parts of a year.

The *Heliocentric Coördinates* of the Planets (pages 402–409) are referred to the mean equinox and ecliptic of the mean noon of the 2405,000th day of the Julian Period, or 1872, July 25.

The columns  $-\frac{k^2}{r^3}x$ , &c., contain the quantities  $-1600 m \frac{k^2}{r^3}x$ ,  $-1600 m \frac{k^2}{r^3}y$ ,  $-1600 m \frac{k^2}{r^3}z$ , in units of the 7th decimal place, in which  $m$  denotes the mass of the planet, and  $k^2$  the unit of attractive force in the solar system, or  $\log k = 8.2355814$ .

Page 409 contains the *Inclinations and Longitudes of the Ascending Nodes* at the same epoch, and the *Masses* of the several Planets with their logarithms. The changes of the Inclinations and Nodes in 100 days include the motions of the ecliptic and equinox.

The *Heliocentric Coördinates and Masses* of the Planets are given for the computation of perturbations.

*Eclipses*.—Pages 410–416 contain the elements necessary for computation and the principal phases of each eclipse of the SUN and MOON. The semidiameters of the moon are  $2''.5$ , and those of the sun  $2''.2$ , less than those in the Ephemeris.

The charts of the *Solar Eclipses* show the part of the world in which each is visible. The dotted curves pass through places, where the eclipse begins, or ends, at an exact hour of Washington mean time, and aid in finding an approximate time of the beginning, or end, at any place. The limits and central line will give some idea of the magnitude of the eclipse. The longitudes are reckoned west from Washington.

The Tables of *Data of the Solar Eclipses* contain certain quantities\* derived from the elements and independent of the place of observation. They are given for successive times at the Washington meridian; and if their values for the *Penumbra* be taken out for a time  $T_0$ , assumed near that of the beginning, or end, of the eclipse at any place, the prediction for that place may be computed quite accurately by the following formulæ:

$$\begin{aligned} \text{Let } \varphi &= \text{the latitude of the place, } + \text{ when north,} \\ \lambda &= \text{its longitude from Washington, } + \text{ when west,} \\ (\text{Bessel.}) \log e &= 8.912205, \quad \log (1 - e^2) = 9.9970916, \quad \sin \chi = e \sin \varphi, \\ h &= \sec \chi \cos \varphi, \quad k = (1 - e^2) \sec \chi \sin \varphi, \\ a &= A - h \sin (\mu - \lambda), \\ b &= B - E k + G h \cos (\mu - \lambda), \\ c &= -C + F k - H h \cos (\mu - \lambda), \\ m &= \sqrt{b c} \quad (\text{usually with same sign as } a). \end{aligned}$$

\*The formulæ are given in CHAUVENET'S *Spherical and Practical Astronomy*, Vol. I, page 513. The changes of  $A$ ,  $B$ , and  $C$  for one minute, or one second, are expressed in units of the sixth decimal place.

If  $m = a$ , the time  $T_0$  is correctly chosen. If  $m$  differ from  $a$ , a correction  $t$  of the assumed time may be obtained in seconds by the formulæ,

$$\begin{aligned} \log \mu' &= 1.86167, & a' &= A' - \mu' h \cos (\mu - \lambda), \\ \tan \frac{1}{2} Q &= \frac{c}{m} = \frac{m}{b}, & b' &= B' - \mu' G h \sin (\mu - \lambda), \end{aligned}$$

$$t = \frac{1000000 (m - a)}{a' + b' \cot Q}$$

and a new approximation to the actual Washington time will be

$$T_0' = T_0 + t,$$

with which the computation may be revised.

Thus successive approximations are made until for the last assumed time  $T_0$ ,  $m = a$  very closely, and  $t$  is quite small. The local mean time of the phenomenon will be, using the last values of  $T_0$  and  $t$ ,

$$T_0 + t - \lambda.$$

$Q$  must be taken of the same sign with  $a$ , and is a sufficiently near approximation to the angular distance of the point of contact reckoned from the *north* point of the sun's limb, + towards the *east*.

For a total or annular eclipse, the prediction of the interior contacts may be made in the same way, using the *Data* for the *Shadow*; except that  $Q$  will have a sign opposite that of  $a$  in a total eclipse.

To find  $V$ , the angular distance of the point of contact from the *Vertex* of the sun's limb, + towards the *left*, we have the formulæ

$$\begin{aligned} p \sin P &= \sin \varphi & c \sin C &= \cos P \tan (\mu - \lambda) \\ p \cos P &= \cos \varphi \cos (\mu - \lambda) & c \cos C &= \sin (P - \delta') \\ V &= Q - C, \end{aligned}$$

in which  $\delta'$  is the sun's declination.

If the values of  $Q$  at the beginning and at the end of the eclipse be found, and their difference (with regard to signs) be denoted by  $2\theta$ , the number of digits eclipsed is

$$12 (1 + n) \sin^2 \frac{1}{2} \theta, \quad \text{or} \quad 12 (1 + n) \cos^2 \frac{1}{2} \theta,$$

according as  $\theta$  is acute or obtuse:  $n$  being the quotient of the semidiameter of the moon divided by that of the sun.

$\theta$  may also be found from the formulæ:

$$\tan R = \frac{b'}{a'} \quad \theta = Q + R$$

(in which  $R$  has the sign of  $b'$ ); and the expression of  $t$  may be changed to

$$t = 1000000 \cdot \frac{m - a}{a'} \cdot \frac{\sin Q \cos R}{\sin \theta}.$$

The following is an example of the computation of the end of the Eclipse of June 5, 1872, for the Astronomical Station at Sitka, Alaska, for which

$\varphi = + 57^\circ 2' 52''$	$\lambda = 58^\circ 14' 54''$
(1) $\log e = 8.912205$	
(2) $\text{l. sin } \varphi = 9.9238264$	(1) + (2) $\text{l. sin } \chi = 8.836031$
(3) $\log (1 - e^2) = 9.9970916$	
(4) $\text{l. sec } \chi = 0.0010229$	(2) + (3) + (4) $\log k = 9.9219409$
(5) $\text{l. cos } \varphi = 9.7355506$	(4) + (5) $\log h = 9.7365735$

By the chart, the Washington mean time of the end of the eclipse at Sitka is  $12^{\text{h}} 0^{\text{m}}$ .

A nearer approximation is  $12^{\text{h}} 2^{\text{m}}.7$  for which we take from the table for *Penumbra*, on page 412, the values of  $A$ ,  $B$ ,  $C$ , &c.

*Computation of  $t$ , the correction of  $T_0$ .*

	$\mu = 181^\circ 5' 2.6$	(9)	$E = 9.965848$
	$\mu - \lambda = 129^\circ 50' 8.6$	(10)	$k = 9.921941$
		(11)	$F = 9.964171$
(1)	$\text{l. sin } (\mu - \lambda) = 9.9243975$	(9) + (10)	$E k = 9.887789$
(2)	$\log h = 9.7365735$	(10) + (11)	$F k = 9.886112$
(3)	$\text{l. cos } (\mu - \lambda) = 9.7341853 \pi$		
		(12)	$A = + 0.86600$
(4) = (1) + (2)	$\log. h \sin (\mu - \lambda) = 9.660971$	(13)	$- h \sin (\mu - \lambda) = - 0.45811$
(5)	$\log \mu' = 1.86167$		
(6)	$\log G = 9.581508$	(14)	$B = + 1.06018$
(7) = (2) + (3)	$\log. h \cos (\mu - \lambda) = 9.470759 \pi$	(15)	$- E k = - 0.77231$
(8)	$\log H = 9.591100$	(16)	$G h \cos (\mu - \lambda) = - 0.11279$
		(17)	$- C = + 0.06544$
(6) + (7)	$\log. G h \cos (\mu - \lambda) = 9.052267 \pi$	(18)	$F k = + 0.76933$
(7) + (8)	$\log. H h \cos (\mu - \lambda) = 9.061859 \pi$	(19)	$- H h \cos (\mu - \lambda) = + 0.11531$
(5) + (7)	$\log. \mu' h \cos (\mu - \lambda) = 1.33243 \pi$		
(4) + (5) + (6)	$\log. \mu' G h \sin (\mu - \lambda) = 1.10415$	(12) + (13)	$a = + 0.40719$
		(14) + (15) + (16)	$b = + 0.17508$
(20)	$\log b = 9.243236$	(17) + (18) + (19)	$c = + 0.95008$
(21)	$\log e = 9.977760$		$m = + 0.40785$
(22) = $\frac{1}{2} [(20) + (21)]$	$\log m = 9.610496$		$m - a = - 0.00013$
(22) - (20) = (21) - (22)	$\text{l. tan } \frac{1}{2} Q = 0.367862$		
Angle from $N$ . point,	$Q = + 133^\circ 32'.1$	(23)	$A' = + 139.56$
		(24)	$- \mu' h \cos (\mu - \lambda) = + 21.50$
(29)	$\text{l. cot. } Q = 9.97778 \pi$	(25)	$B' = + 29.18$
(30)	$\log b' = 1.21669$	(26)	$- \mu' G h \sin (\mu - \lambda) = - 12.71$
(29) + (30)	$\log. b' \cot Q = 1.9447 \pi$		
		(25) + (26)	$b' = + 16.47$
(31)	$\log (m - a) + 6 = 2.1139 \pi$	(27) = (23) + (24)	$a' = 161.06$
(32)	$\log (a' + b' \cot Q) = 2.1626$	(28)	$b' \cot Q = - 15.65$
(31) - (32)	$\log t = 9.9513 \pi$	(27) + (28) $a' + b' \cot Q =$	$145.41$

Assumed time, . . . . .  $T_0 = 12^{\text{h}} 2^{\text{m}} 42.00$   
 Correction of the assumed time, . . . . .  $t = - 0.89$   
 Washington time of the end, . . . . . June 5, 12 2 41.11  
 Sitka time of the end, . . . . . June 5, 8 9 41.51

We have also  $C = +27^\circ 14'$ ; the angle from the *Vertex*,  $V = +106^\circ 18'$ ;  $\delta = +139^\circ 22'$ , and the magnitude of the eclipse 2.8 digits, or 0.23 of the sun's disc, on the south limb.

*Occultations.*—Pages 417–418 contain a list of such occultations and near approaches as will be visible at Washington during the year 1872. For the latter, the time of nearest approach, the nearest point of the moon's limb, and the distance of the star from the moon's limb, are stated.

Pages 419–451 contain *Elements for facilitating the Prediction of Occultations of Planets and Stars by the Moon*. The list includes all stars to the  $6\frac{1}{2}$  magnitude in the *Catalogue of the British Association*, and a few others of less magnitude, contained in the *Almanac Catalogue of Zodiacal Stars* and chiefly belonging to clusters, which can be occulted during the year 1872.

The elements comprise the *Date, the Name, Magnitude and Declination of the Star*; the *Limiting Latitudes* within which the occultation may be visible; and, at the time of geocentric conjunction of the moon and star in right ascension, the following quantities;

$\delta$  = Washington mean time,

$H$  = Hour angle of the star at Washington,  $+$  when west;

$$X = \frac{15 (a - a')}{\pi} \cos \delta = 0, \quad Y = \frac{\delta - \delta'}{\pi},$$

$$x' = \frac{15 \Delta a}{\pi} \cos \delta, \quad y' = \frac{\Delta \delta}{\pi}, \text{ the hourly changes of } x \text{ and } y;$$

in which  $\alpha$  and  $\delta$  are the true right ascension and declination of the moon,  
 $\Delta \alpha$  and  $\Delta \delta$ , their motions in one hour of mean time,  
 $\pi$ , the moon's equatorial horizontal parallax,  
 $\alpha'$  and  $\delta'$ , the apparent right ascension and declination of the star.

The reductions of the mean place of the star at the beginning of the year to its apparent place at the date, are also given to facilitate the reduction of observed occultations.

For any other Washington mean time  $T = \phi + t$ , we have ( $\mu$  being the sidereal equivalent of  $t$ , and  $t$  as a coefficient being expressed in hours)

$$\begin{aligned} \lambda &= H + \mu, \text{ the star's hour angle at Washington,} \\ x &= t x', \quad y = Y + t y'. \end{aligned}$$

As the moon's motion is here regarded as uniform, the expressions for  $x$  and  $y$  are more nearly correct the smaller the interval  $t$ . The exact values, to be employed in the reduction of an observed occultation, are

$$\begin{aligned} x &= \frac{\sin(\alpha - \alpha') \cos \delta}{\sin \pi} \\ y &= \frac{\sin(\delta - \delta') \cos^2 \frac{1}{2}(\alpha - \alpha') + \sin(\delta + \delta') \sin^2 \frac{1}{2}(\alpha - \alpha')}{\sin \pi} \end{aligned}$$

in which  $\alpha$ ,  $\delta$  and  $\pi$  are to be taken from the Ephemeris for the time  $T$ . But for predicting the times of *immersion* and *emersion*, and the points on the moon's limb where these appearances take place, the preceding expressions suffice to enable the observer to determine when and where to watch for these phenomena.

For the place of observation, let

$$\begin{aligned} \varphi &= \text{its latitude, } + \text{ when north;} \\ \lambda &= \text{its longitude from Washington, } + \text{ when west;} \\ (\text{Bessel.}) \quad \log e &= 8.9122 \ 05, \quad \log(1 - e^2) = 9.9970 \ 916, \\ \sin \chi &= e \sin \varphi, \quad E = (1 - e^2) \sec \chi, \quad F = \sec \chi. \\ \mu' &= 54147.8 \sin 1'', \quad \log \mu' = 9.41916. \end{aligned}$$

The constants for the place, required both in the prediction of occultations and the reduction of those observed, are  $\varphi$ ,  $\lambda$ , and  $E \sin \varphi$ ,  $F \cos \varphi$ ,  $\mu' F \cos \varphi$ , or their logarithms.

The values of  $E$  and  $F$  and their logarithms are given for different latitudes in the following table:

$\varphi$	$E$ .	$F$ .	Log $E$ .	Log $F$ .
0°	1—.0067	1.0000	9.9971	0.0000
±10	1—.0066	1.0000	9.9971	0.0000
20	1—.0063	1.0004	9.9973	0.0002
30	1—.0059	1.0008	9.9975	0.0004
40	1—.0053	1.0014	9.9977	0.0006
50	1—.0047	1.0020	9.9979	0.0009
60	1—.0042	1.0025	9.9982	0.0011
70	1—.0037	1.0030	9.9984	0.0013
80	1—.0034	1.0033	9.9985	0.0014
90	1—.0033	1.0034	9.9985	0.0014

An occultation will not be visible unless,

1. The latitude of the place is included within the limiting parallels;
2. At the time of occultation, or the local mean time ( $T - \lambda$ ), the sun is sufficiently below the horizon;

3. At that time the star is above the horizon, or its local hour angle ( $h-\lambda$ ) is numerically less than  $\tau$  found by the formula

$$\cos \tau = -\tan \varphi \tan \delta'.$$

A table of  $\tau$ , or the hour angle of a body in the horizon, computed for the latitude of the place and different declinations, will be useful for such comparisons.

These conditions can generally be determined in advance, as in latitudes less than  $60^\circ$  ( $\delta-\lambda$ ) may be used instead of ( $T-\lambda$ ) except within two hours of sunrise or sunset; and ( $H-\lambda$ ) instead of ( $h-\lambda$ ) except within half an hour of the star's rising or setting. For these exceptional cases, which, however, are not favorable for observation, the time of *apparent* conjunction in right ascension, or some nearer approximation to the time of occultation, can be subsequently employed.

Having ascertained that an occultation will be visible, we may proceed to compute the times of immersion and emersion by the following formulæ:

1. To find approximately the time\* of *apparent* conjunction in right ascension, as affected by parallax;

$$u = F \cos \varphi \sin (H-\lambda)$$

$$u' = \mu' F \cos \varphi \cos (H-\lambda)$$

$$\text{In hours,} \quad (t) = \frac{u}{x' - u'}$$

Washington time of *apparent* conjunction, ( $T$ ) =  $\delta + (t)$

Local " " " ( $T$ ) -  $\lambda$

The value of ( $T$ ) to the nearest tenth of an hour is sufficiently accurate. If a closer approximation is desired, the computation may be repeated, using  $h = H + (\mu)$  instead of  $H$ , ( $\mu$ ) being the sidereal equivalent of ( $t$ ),

$$x = (t) x' \quad (t') = -\frac{x-u}{x'-u'}$$

$$(T') = (T) + (t').$$

2. To find a nearer approach to the time of either phase, let us assume the Washington mean time  $T$ , which for the first computation may be the computed time of *apparent* conjunction, or some conjectural time near it. For this time find

$$t = T - \delta \quad h = H + \mu, \text{ or } h - \lambda = H - \lambda + \mu$$

$$x = t x' \quad y = Y + t y',$$

and then  $T_1$  and  $T_2$ , the approximate Washington mean times of immersion and emersion, by the following formulæ. The local mean times will be found by subtracting from  $T_1$  and  $T_2$  the longitude of the place.

$$A \sin B = E \sin \varphi \quad u = F \cos \varphi \sin (h-\lambda);$$

$$A \cos B = F \cos \varphi \cos (h-\lambda)^\dagger \quad v = A \sin (B-\delta')$$

$$u' = \mu' A \cos B$$

$$v' = \mu' u \sin \delta'$$

[or, with other auxiliaries than  $A$  and  $B$ ,

$$b = F \cos \varphi \cos (h-\lambda) \quad u' = b \mu' \quad v = E \sin \varphi \cos \delta' - b \sin \delta']$$

$$m \sin M = x - u \quad n \sin N = x' - u'$$

$$m \cos M = y - v \quad n \cos N = y' - v'$$

$$(\text{Burckhardt.}) \quad k = .27227 \quad \log k = 9.43500$$

$$\cos \phi = \frac{m \sin (M-N)}{k} \quad \phi < 180^\circ$$

\* It is convenient, but not necessary, to have this time.

† If ( $h-\lambda$ ) be restricted to values numerically less than  $12^\circ$ , or  $180^\circ$ ,  $B$  may be taken in the same quadrant with ( $h-\lambda$ ), and have the same sign as the latitude. For a place where many occultations are observed, tables of  $A$ ,  $B$ ,  $u$  and  $u'$  for different values of ( $h-\lambda$ ), or of  $E \sin \varphi \cos \delta'$  for different declinations, would be convenient.

	For Immersion.	For Emersion.
In hours,	$t_1 = -\frac{m \cos (M-N)}{n} - \frac{k \sin \phi}{n}$	$t_2 = -\frac{m \cos (M-N)}{n} + \frac{k \sin \phi}{n}$
Washington mean time, $T_1 = T + t_1$		$T_2 = T + t_2$
Local " " $T_1 - \lambda$		$T_2 - \lambda$

3. Assuming now  $T_1 = \delta + t + t_1$  for the Immersion, or  $T_2 = \delta + t + t_2$  for the Emersion, as the Washington time instead of  $T$ , and recomputing, we can obtain nearer approximations to the times of these phenomena. But the first operation will give the times usually within one or two minutes, which is sufficiently accurate for watching for an immersion. For an emersion a more accurate knowledge is desirable. But for this purpose it will often be sufficient to substitute  $(h_2 - \lambda) = (h - \lambda + \frac{1}{2} \mu_2)$  for  $(h - \lambda)$  in the computation of  $u'$  and  $v'$ , and, using the same  $m$  and  $M$  as before, recompute  $n$ ,  $N$ ,  $\phi$  and  $t_2$ , a new correction to be added to  $T$ .

If  $\log. m \sin (M-N) = 9.4350$  nearly, a recalculation will generally be necessary to determine whether, numerically,  $\cos \phi < 1$ , or  $\cos \phi > 1$ . In the latter case the impossible value of  $\cos \phi$  indicates that an occultation at the given place is impossible, unless the computed distance from the moon's limb is within the errors of the Ephemeris of the moon and star.

In such cases of near approach to the moon's limb, we may take  $\phi = 0^\circ$ , or  $180^\circ$ , according as  $m \sin (M-N)$  is + or -; and for finding the time of nearest approach,

$$t = -\frac{m \cos (M-N)}{n}$$

The distance from the moon's limb is then

$$\pi [m \sin (M-N) - k],$$

disregarding the sign of  $m \sin (M-N)$ ; or, allowing for the augmentation of the semi-diameter,

$$\pi [m \sin (M-N) - k] [1 + z \sin \pi],$$

where

$$z = A \cos (B - \delta').$$

4. Having found satisfactorily the times of immersion and emersion, and therefore  $N$  and  $\phi$  in each case, we have as the angle from the North point of the moon's limb and reckoned towards the West,

$$Q = 90^\circ - N - \phi \quad \text{for an Immersion,}$$

$$Q = 90^\circ - N + \phi \quad \text{for an Emersion;}$$

and, taking

$$c \sin C = u + t u'$$

$$c \cos C = v + t v',$$

in which the last value of  $t$  for the particular phase is properly used, we have as the angle from the Vertex of the moon's limb, or that point which is nearest the zenith,

$$V = Q + C$$

also reckoned in the same direction as  $Q$ .

For the image as seen through an inverting telescope, these angles should be increased by  $180^\circ$ .

5. As a check on the accuracy of the work, we have, using the last computed values of the several quantities,

$$[(x-u) + t(x'-u')]^2 + [(y-v) + t(y'-v')]^2 = k^2 = 0.07413;$$

Or, we may recompute with the last determined time of immersion, or of emersion,  $u$ ,  $v$ ,  $x$ , and  $y$ , and we should have for either, as the condition of the phenomenon,

$$(x-u)^2 + (y-v)^2 = k^2 = 0.07413$$

$$\text{or,} \quad \log m = \log k = 9.4350$$



Greater values than these indicate that the computed time of immersion is too early, and of emersion too late, by a quantity nearly proportional to the difference.

As an example, suppose it is required to find the times of immersion and emersion of B. A. C. 1774, January 21, 1872, at Telegraph Hill, San Francisco, California, for which

$$\phi = +37^{\circ} 48'.1$$

$$\lambda = +3^h 1^m.4.$$

The data for the computation are given on page 420. We see in advance that  $\phi$  is between the limiting parallels; that  $(\phi - \lambda)$  is  $8^h 44^m.8$ , or more than three hours after sunset; and that  $(H - \lambda)$  is less than an hour, or six hours less than the star's hour angle at rising.

The constants of the place are:

$l. \sin \phi = 9.7874$	$l. \cos \phi = 9.8977$	
$\log. E = 9.9977$	$\log. F = 0.0006$	$\log. \mu' = 9.4192$
(1) $\log. E \sin \phi = 9.7851$	(2) $\log. F \cos \phi = 9.8983$	(3) $\log. \mu' F \cos \phi = 9.3175$

From page 420, we find, for the time of *geocentric* conjunction:

<i>Washington time,</i> $\phi = 11^h 46.2$	$Y = +2694$	$\delta' = +23^{\circ} 14.9$
$H = +2^h 18.2$	$x' = +.5417$	$l. \sin \delta' = 9.5963$
<i>San Francisco time,</i> $\phi - \lambda = 8^h 44.8$	$y' = +.0762$	
$H - \lambda = -0^h 43.2 = -10^{\circ} 48'.0$		

1. For an approximation to the time of *apparent* conjunction, we have:

(2) $\log. F \cos \phi = 9.898$	(3) $\log. \mu' F \cos \phi = 9.317$	$x' = +.542$
(4) $l. \sin (H - \lambda) = 9.273n$	(5) $l. \cos (H - \lambda) = 9.992$	$u' = +.204$
(6) = (2) + (4) $\log. u = 9.171n$	(7) = (3) + (5) $\log. u' = 9.309$	$x' - u' = +.338$
(8) $\log. (x' - u') = 9.529$		
(6) - (8) $\log. (t) = 9.642n$	$(t) = -0.438 = -0^h 26.3$	
	$\phi = 11^h 46.2$	
	$(T) = \phi + (t) = 11^h 19.9$	

*Washington mean time,*

2. Assuming  $T = 11^h 19^m.9$ , and therefore  $t = -0^h 26^m.3$ , we proceed as follows to find the times of immersion and emersion:

(9) Sid eq. of $t$ $\mu = -0^h 26.4$	(25) $X = 0.$
(10) $H - \lambda = -0^h 43.2$	(26) $t x' = -0.438 \times .5417 = -.2373$
(11) = (9) + (10) $k - \lambda = -1^h 9.6 = -17^{\circ} 24'.0$	(27) $Y = +2694$
	(28) $t y' = -0.438 \times .0762 = -.0334$
(12) $l. \sin (k - \lambda) = 9.4757n$	
(13) = (2) $\log. F \cos \phi = 9.8983$	(29) = (25) + (26) $x = -.2373$
(14) $l. \cos (k - \lambda) = 9.9797$	(30) $u = -.2366$
	(31) = (27) + (28) $y = +.2360$
(15) $l. \sin \delta' = 9.5963$	(32) $v = +.2620$
(16) = (12) + (13) $\log. u = 9.3740n$	(33) = (29) - (30) $x - u = m \sin M = -.0007$
(17) $Constant, \log. \mu' = 9.4192$	(34) = (31) - (32) $y - v = m \cos M = -.0260$
(18) = (13) + (14) $\log. A \cos B = 9.8780$	
(19) = (1) $\log. A \sin B = 9.7851$	(35) $x' = +.5417$
(20) = (19) - (18) $l. \tan B = 9.9071$ $B = +38^{\circ} 55'$	(36) $u' = +.1983$
(21) $l. \cos B = 9.8910$ $\delta' = +23^{\circ} 15'$	(37) $y' = +.0762$
(22) = (18) - (21) $\log. A = 9.9870$ $B - \delta' = +15^{\circ} 40'$	(38) $v' = -.0245$
(23) $l. \sin (B - \delta') = 9.4314$	(39) = (35) - (36) $x' - u' = n \sin N = +.3434$
(24) = (22) + (23) $\log. v = 9.4184$	(40) = (37) - (38) $y' - v' = n \cos N = +.1007$
(41) $\log. m \sin M = 6.8451n$	(45) $\log. n \sin N = 9.5358$
(42) $\log. m \cos M = 8.4150n$	(46) $\log. n \cos N = 9.0031$
(43) = (41) - (42) $l. \tan M = 8.4301$ $M = 181^{\circ} 33'$	(47) = (45) - (46) $l. \tan N = 0.5327$
(44) $l. \cos M = 9.9998$ $N = 73^{\circ} 39'$	(48) $l. \sin N = 9.9821$
$M - N = 107^{\circ} 54'$	
(49) = (42) - (44) $\log. m = 8.4152$	(49) $\log. m = 8.4152$
(50) $l. \sin (M - N) = 9.9785$	(53) $l. \cos (M - N) = 9.4876n$
(51) $Constant, \log. \frac{1}{k} = 0.5650$ $90^{\circ} - N = +16^{\circ} 21'$	(54) = (48) - (45) $\log. \frac{1}{n} = 0.4463$
(52) = (49) + (50) + (51) $l. \cos \psi = 8.9587$ $\psi = +84^{\circ} 47'$	(55) = (49) + (53) + (54) $\log. m \cos (M - N) = 8.3491n$

<i>Angle from N. point at Im.</i>	$Q_1 = -68^\circ$ (54)	$\log. \frac{1}{n} = 0.4463$
" " " at Em.	$Q_2 = +101$ (56) <i>Constant</i> ,	$\log. k = 9.4350$
	(57)	$l. \sin \psi = 9.9982$
(59)	$\frac{k}{n} \sin \psi = +0.758$ (58)=(54)+(56)+(57)	$\log. \frac{k}{n} \sin \psi = 9.8795$
(60)	$-\frac{m}{n} \cos (M-N) = +0.022$	

For Immersion.

For Emersion.

(60)–(59)	$t_1 = -0.736 = -0^h 44.2^m$ (60)+(59)	$t_2 = +0.780 = +0^h 46.8^m$
	$T = 11 19.9$	$T = 11 19.9$
<i>Washington mean time,</i>	$T_1 = T + t_1 = 10 35.7$	$T_2 = 12 6.7$
	$\lambda = 3 1.4$	$\lambda = 3 1.4$
<i>San Francisco mean time,</i>	$T_1 - \lambda = 7 34.3$	$T_2 - \lambda = 9 5.3$

3. Assuming these times and revising the computation, we obtain as a nearer approximation:

	$t'_1 = +0^h 1.1^m$	$t'_2 = +0^h 0.8^m$
<i>San Francisco mean time,</i>	$T_1 - \lambda = 7 35.4$	$T'_1 - \lambda = 9 6.1$
<i>Angle from N. point,</i>	$Q'_1 = -67^\circ.6$	$Q'_2 = 100^\circ.0$
	$c_1 \sin C_1 = u + t'_1 u' = -0.374$	$c_2 \sin C_2 = u + t'_2 u' = -0.075$
	$c_1 \cos C_1 = v + t'_1 v' = +0.285$	$c_2 \cos C_2 = v + t'_2 v' = +0.249$
and by the Traverse Table,*	$C_1 = -52^\circ.7$	$C_2 = -16^\circ.8$
and <i>Angle from Vertex</i>	$V_1 = Q'_1 + C_1 = -120^\circ.3$	$V_2 = Q'_2 + C_2 = 83^\circ.2$

We shall also find for  $[(x-u) + t'(x'-u')]^2 + [(y-v) + t'(y'-v')]^2$ 

At Im. 0.0741

At Em.

0.0741

or very nearly 0.07413, the value of  $k^2$ .

Instead, however, of an entire recomputation, a partial revision may be made, like the following for correcting the computed time of emersion:

(9)	$\frac{1}{2} t_2 = +0^h 23.4^m$	$\frac{1}{2} \mu_2 = +0^h 23.5^m$	(35)	$x' = +5.417$
(10)	$k - \lambda = -1 9.6$		(36)	$u' = +2.036$
(11)=(9)+(10)	$k_2 - \lambda = -0 46.1 = -11 31.5$		(37)	$y' = +0.762$
			(38)	$v' = -0.164$
(12)	$l. \sin (k_2 - \lambda) = 9.3006n$		(39)=(35)–(36)	$x' - u' = n \sin N = +.3381$
(13)=(2)	$\log. F \cos \phi = 9.8983$		(40)=(37)–(38)	$y' - v' = n \cos N = +.0926$
(14)	$l. \cos (k_2 - \lambda) = 9.9912$			
(15)	$l. \sin d' = 9.5963$		(45)	$\log. n \sin N = 9.5290$
(16)=(12)+(13)	$\log. u = 9.1989n$	$l. v' = 8.2144n$	(46)	$\log. n \cos N = 8.9666$
(17)	$\log. \mu' = 9.4192$		(47)=(45)–(46)	$l. \tan N = 0.5624$
(18)=(13)+(14)	$\log. A \cos B = 9.8895$	$l. u' = 9.3087$	(48)	$l. \sin N = 9.9843$
			(49)	$\log. m = 8.4152$
(49) From 1st Comp.	$\log. m = 8.4152$	$M = +181 33$ (53)		$l. \cos (M-N) = 9.4626n$
(50)	$l. \sin (M-N) = 9.9809$	$N = +74 41$ (54)=(48)–(45)		$\log. \frac{1}{n} = 0.4553$
(51)	<i>Constant</i> , $\log. \frac{1}{k} = 0.5650$	$M-N = +106 52$ (55)=(49)+(53)+(54)		$\log. \frac{m}{n} \cos (M-N) = 8.3331r$
(52)=(49)+(50)+(51)	$l. \cos \psi = 8.9611$	$90^\circ - N = +15 19$ (56)	<i>Constant</i> ,	$\log. k = 9.4350$
		$\psi = +84 45$ (57)		$l. \sin \psi = 9.9982$
<i>Angle from N. point,</i>	$Q_2 = +100 4$ (58)=(54)+(56)+(57)			$\log. \frac{k}{n} \sin \psi = 9.8885$
(59)	$-\frac{m}{n} \cos (M-N) = +0.0215$			
(60)	$\frac{k}{n} \sin \psi = +0.7736$			
(59)+(60)	$t'_2 = +0.7951 = +0^h 47.7^m$			
	$T = 11 19.9$			
<i>Washington mean time,</i>	$T'_2 = T + t'_2 = 12 7.6$			
<i>San Francisco mean time,</i>	$T'_2 - \lambda = 9 6.2$			

\* A large portion of this computation may be made by the Traverse Table instead of logarithms.

*Jupiter's Satellites*, pages 452–483.—These pages contain for the several Satellites—

1. The Washington mean times of the occultations, eclipses, transits and transits of shadows, arranged in the order of time. *W*, after a phase, indicates such as are visible at Washington, or which occur when the sun is more than  $8^\circ$  below and Jupiter more than  $8^\circ$  above the horizon of that place.

2. A diagram for each month constructed for the eclipse which occurs nearest the middle of the month, showing the phases of the eclipse for an inverting telescope. The stars indicate the points of disappearance and reappearance, distinguished by *d* and *r*. The space between them shows the position of the shadow of the planet.

3. Washington mean time of geocentric superior conjunction, arranged for each planet separately.

4. The rectangular coördinates  $x'$  and  $y'$  for successive times reckoned from the next preceding superior conjunction, computed for a constant major axis and maximum minor axis of the apparent ellipse described by the satellite as seen from the sun at its mean distance from the planet.

5. The *factors* by which  $x'$  and  $y'$  are to be multiplied to obtain the actual coördinates  $x$  and  $y$  for the apparent ellipse, as seen from the earth at any date; the inclination  $p$  of the minor axis to the circle of declination, reckoned from the *north*, positive towards the *east*; and the actual coördinates  $x$  and  $y$  at the times of eclipse of each satellite.

The coördinates are referred to the centre of the primary and to the major and minor axes of the ellipse described by the satellite, and are expressed in seconds of arc.  $x$  is positive when on the *east* side of the planet;  $y$  is positive when *north*. By means of them the configurations of the satellite can be found at any time.

The *Elements of Saturn's Ring*, page 484, give the *apparent* magnitude and position of its several components for each 20 days. The *apparent Discs of Venus and Mars* are given on the same page for each 30 days.

The *Phenomena*, pages 485, 486, include the times of conjunction, opposition and quadrature, perihelion and aphelion, stationary points, and conjunction, with the moon in right ascension, of the principal planets.

The *Positions of the Principal Observatories* are given on pages 494, 495. The preceding pages give the authorities for these positions, and the longitudes with reference to the meridians upon which they actually depend.

## APPENDIX.



## CONSTRUCTION OF THE ASTRONOMICAL AND NAUTICAL EPHEMERIDES FOR 1872.

THE Précession of the Equinoxes, the Mean Obliquity of the Ecliptic, and the Constant of Aberration (p. 250) are taken from STRUVE and PETERS. They are :

$$\text{Precession}^* = 50''.2411 + 0''.0002268 t,$$

$$\text{Obliquity}^\dagger = 23^\circ 27' 54''.22 - 0''.4645 t - 0''.0000014 t^2,$$

$$\text{Aberration}^\ddagger = 20''.4451 \pm 0''.0111,$$

in which  $t$  is the number of years after 1800.

The Nutation of the Apparent Obliquity and the Equation of the Equinoxes are computed from PETERS' formulæ given in his *Numerus Constans Nutationis*, pp. 46-48, and reprinted in the volume of this Ephemeris for 1855. These quantities have been used in all computations relating to the Fixed Stars.

In the Ephemerides of the Sun, Moon, and Planets, the Obliquity of the Ecliptic and the Nutation of HANSEN and OLUFSEN's *Tables du Soleil* have been used. The Aberration in these tables,  $20''.255$ , has been used in the Ephemeris of the Sun. The Mean Obliquity exceeds that of PETERS by  $0''.37$ .

The General Constants for Star Reduction are adapted to the formulæ given on page 260. They are computed from the *Tables to facilitate the Reduction of Places of the Fixed Stars, prepared for the use of the American Ephemeris and Nautical Almanac*, Washington, 1869, which have been used in manuscript in the preparation of previous volumes of this work subsequent to that of 1861.

The Mean Places of the 198 Standard Stars have also been taken from the same tables. Dr. GOULD's *Standard Places of Fundamental Stars, U. S. Coast Survey*, Washington, 1866, is the authority given for 48 Northern Circumpolar Stars and 128 Time Stars; the *British Nautical Almanac* for 1848 for 13 Stars south of  $-40^\circ$  declination; and WOLFER's *Tabulæ Reductionum Observationum Astronomicarum*, Berlin, 1858, for Sirius, Castor, (the mean of the components,) Procyon,  $\gamma$  Draconis, and  $\alpha$  Cephei. The magnitudes, except of the 13 Southern Stars, are ARGELANDER's.

The reductions from the mean to the apparent places of the Stars contained in WOLFER's *Tabulæ Reductionum*, except  $\alpha$  and  $\delta$  Ursæ Minoris, have been derived from that work; the reductions of the rest from the *Tables to facilitate Reductions* of the American Ephemeris. These reductions include the terms of the formulæ on pages 260 and 503, so far as sensible, except those depending on the moon's longitude. The terms depending on  $2 \text{ } \mathfrak{C}$  have, however, been applied to the four stars whose places are given for every day. The values of these terms for seven circumpolar stars, computed for 1870, are given in Table IV. of this Appendix.

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\* PETERS' *Numerus Constans Nutationis*, p. 71.

† Ibid., pp. 66 and 71.

‡ STRUVE's *Constant de l'Aberration*, p. 47.

## APPENDIX.

To the position of Sirius, as derived from WOLFFERS, (the correction of the "*Tabula Subsidiaria*" being omitted), have been applied the terms given by AUWERS,\*

$$q = +0^{\circ}.0647 - 0^{\circ}.000718 (t - 1860) + 0^{\circ}.1510 \cos (u + 1^{\circ} 6') \\ r = -0^{\circ}.630 - 0^{\circ}.00044 (t - 1860) + 1^{\circ}.445 \sin (u + 23^{\circ} 30')$$

in which  $u$ , the eccentric anomaly from the inferior apsis, is found by the formula

$$u - e \sin u = n (t - T),$$

from the elements

$$T = 1793.830, \text{ passage through the inferior apsis,} \\ e = 0.6010, \text{ the eccentricity,} \\ n = 7^{\circ}.28475, \text{ mean annual motion in orbit,} \\ 49^{\circ}.418, \text{ period of revolution.}$$

The Mean Places of such of the Moon-culminating Stars as are not found in the list of standard stars, have been taken in order of preference from the *Almanac Catalogue of Zodiacal Stars printed for the use of the American Ephemeris and Nautical Almanac*, Washington, 1864; the *Greenwich Twelve-Year Catalogue*; and the *Catalogue of the British Association*.

The Ephemeris of the Sun† is constructed from HANSEN and OLUFSEN's *Tables du Soleil*, Copenhagen, 1853. The Sun's rectangular equatorial coördinates have been computed from the longitudes and latitudes by the following formulæ:

$$X = R \cos \lambda \\ Y = R \sin \lambda \cos \omega - 19.3 R \beta \\ Z = R \sin \lambda \sin \omega + 44.5 R \beta \\ X' = X + Y \sec \omega \Delta \lambda \\ Y' = Y - X \cos \omega \Delta \lambda + Z \Delta \omega - 9.4 \tau R \sin (\odot + 187^{\circ}) \\ Z' = Z - X \sin \omega \Delta \lambda - Y \Delta \omega + 21.7 \tau R \sin (\odot + 187^{\circ})$$

in which  $\lambda$ ,  $\beta$  and  $\omega$  are referred to the equinox and ecliptic of the date;  $\Delta \lambda$  is the reduction of longitude for precession and nutation from Jan. 0;  $\Delta \omega$  the reduction of the mean to the apparent obliquity;  $\tau$  the part of the year since Jan. 0; and the numerical coefficients are in units of the 7th place of decimals.

The mean equatorial Horizontal Parallax of the Sun, adopted from Prof. NEWCOMB's *Investigation of the Distance of the Sun and the Elements which depend on it*,‡ is  $8''.848$ . The adopted Semidiameter of the Sun at the Earth's mean distance is  $16' 2''$ .

The Ephemeris of the Moon has been constructed from PEIRCE's *Tables of the Moon*, 2d edition, Washington, 1865. They include the *Tables of the Moon's Parallax* constructed from WALKER's and ADAMS's formulæ.

The Semidiameter of the Moon has been computed from the Moon's Horizontal Parallax by the formula,

$$S = .272274 \pi + 2''.5.$$

A semidiameter  $2''.5$  less is found to be better adapted for the computation of eclipses and occultations.

The Ephemeris of Mercury has been derived from the Tables of Prof. WINLOCK, which are based on the theory of LE VERRIER, published in the *Additions to the Connaissance des Temps* for 1848.

\* *Astronomische Nachrichten*, No. 1506.

† From CARLINI's Tables before 1858.

‡ *Astronomical Observations made at the U. S. Naval Observatory, Washington*, 1865, Appendix II.

## CONSTRUCTION OF THE ALMANAC.

The Ephemeris of Venus has been derived from manuscript Tables, constructed from those of LINDENAU, in a form similar to that adopted for the Lunar Tables: applying AIRY'S Long Equation and the corrections proceeding from the discussion, by the method of Least Squares, of Mr. HUGH BREEN'S results contained in his paper on the *Corrections of LINDENAU'S Elements of the Orbit of Venus, &c.*, published in the *Memoirs of the Royal Astronomical Society*, Vol. XVIII.; and adopting the secular variations of the elements from LE VERRIER'S *Memoir on the Determination of the Secular Inequalities of the Planets*, which appeared in the *Connaissance des Temps* for the year 1844. The following are the corresponding corrected elements, and annual variations for Washington, 1855.0:

$$\begin{aligned} L &= 289^{\circ} 51' 53''.5 + 2106691''.706 t. \\ \pi &= 129 32 59.6 + 49''.57459 t. \\ \Omega &= 75 23 27.3 + 32''.88424 t. \\ i &= 3 23 34.6 + 0''.04363 t. \\ e &= 1410''.6847 - 0''.11157 t. \\ n &= 2106641''.438 \\ a &= 0.7233323 \end{aligned}$$

The Ephemeris of Mars is derived from manuscript Tables constructed from LINDENAU'S Tables in the same manner as the Tables of Venus. Mr. HUGH BREEN'S results contained in his paper *On the Corrections of LINDENAU'S Elements of Mars*, published in the *Memoirs of the Royal Astronomical Society*, Vol. XX., have also been discussed and applied; and LE VERRIER'S secular variations of the elements are likewise adopted. The following are the corresponding corrected elements, and annual variations for Washington, 1855.0:

$$\begin{aligned} L &= 320 13 33.87 + 689101''.1527 t. \\ \pi &= 333 23 17.84 + 65''.9990 t. \\ \Omega &= 48 25 55.29 + 27''.6997 t. \\ i &= 1 51 2.20 - 0''.02141 t. \\ e &= 19238''.75 + 0''.18549 t. \\ n &= 689050''.8927 \\ a &= 1.5236915 \end{aligned}$$

The Ephemeris of Jupiter is derived from manuscript Tables constructed from BOUVARD'S Tables, with such changes as were required to make them correspond more nearly to the formulæ.

The Ephemeris of Saturn is derived from BOUVARD'S Tables. The perturbations produced by Jupiter, and the change of the Great Inequality since 1840, have been increased by  $\frac{1}{50}$  of their value. ADAMS'S Table in the *British Nautical Almanac* for 1851 has been substituted for BOUVARD'S Table XLII. The following corrections of the elements for 1855.0 have also been introduced:

$$\begin{aligned} \text{corr. mean long.} &= + 4''.9 \\ \text{corr. long. of node} &= - 143''.0 \\ \text{corr. inclination} &= - 5''.7 + 0''.0149 t \end{aligned}$$

The Ephemeris of Uranus is derived from the elliptical portion of BOUVARD'S Tables, with LE VERRIER'S corrections and perturbations caused by Jupiter and Saturn, contained in his *Recherches sur les Mouvements de la Planète Herschel (dite Uranus)*, published in the *Connaissance des Temps* for 1849, and also PEIRCE'S corrections and perturbations arising from the influence of Neptune.

The Ephemeris of Neptune is derived from Prof. NEWCOMB'S *Tables of Neptune*, Washington, 1866.



## APPENDIX.

The eclipses and elongations of Jupiter's Satellites are computed from DAMOISEAU'S Tables.

The semidiameters of the Planets are computed from the following values :

	Semidiameter.	Log Dist.	Authority.
Mercury	3.34	0.00	LE VERRIER, <i>Theory of Mercury</i> .
Venus	$8.546 \pm 0.086$	0.00	PEIRCE, from the Washington Observations of 1845 and 1846, made with the mural circle.
Mars (polar)	$2.842 \pm 0.057$	0.25	
Jupiter (polar)*	$18.78 \pm 0.067$	0.70	
Saturn (polar)	$8.77 \pm 0.039$	0.95	
Uranus	$1.68 \pm 0.3$	1.30	
Jupiter (equat.)	20.00	0.70	
Saturn (equat.)	9.38	0.95	

The apparent elements of Saturn's Rings are computed from BESSEL'S data, except those for Bond's dusky ring.

The Tables for the eclipses of the sun are adapted to the modification of BESSEL'S formulæ, suggested by T. HENRY SAFFORD, jr. The formulæ are given in PEIRCE'S *Spherical Astronomy* and CHAUVENET'S *Spherical and Practical Astronomy*, Vol. I.

The elements for occultations of stars by the moon are adapted to BESSEL'S method in the *Astronomische Nachrichten*, Vol. VII., and the *Berliner Astronomisches Jahrbuch* for 1831. The formulæ are also to be found in CHAUVENET'S *Astronomy*.

The intervals of original computation have in all cases been made sufficiently small to authorize the use of the differences as a check of the accuracy of the work. The results have also been tested, in various portions, by means of duplicate computations. The proofs from the stereotype plates have been thoroughly examined by an independent series of differences. And it is believed that, in every respect, that system has been adopted in which accuracy was most likely to be secured.

The principal computations of the Ephemeris have been distributed in the following manner :

The Sun has been computed by Mr. EASTWOOD; the Ephemeris of the Moon and the Lunar Distances by Professor RUNKLE and Mr. WRIGHT. Mercury has been computed by Mr. AUSTIN, Venus by Mr. AUSTIN and Mr. FERREL, Mars by Mr. OLIVER, Jupiter by Professor KENDALL, Saturn by Professor VAN VLECK, Uranus by Mr. FERREL, and Neptune by Mr. WIESSNER. The Fixed Stars and the General Constants for Reduction have been computed by Mr. G. W. HILL, and the Occultations by Mr. DOWNES, assisted by Mr. WIESSNER. The Eclipses have been computed and the Charts projected by Mr. WRIGHT. The Table of Positions of Observatories, originally compiled by Dr. B. A. GOULD, was revised by him for the volume for 1870. The results of the most recent determinations have been incorporated.

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\* In the volumes for 1858 to 1869 inclusive 19'.19, given erroneously in the Appendix for 1855, has been used for the Washington Ephemeris.

# TABLE I.

TABLE SHOWING THE CORRECTION REQUIRED, ON ACCOUNT OF SECOND DIFFERENCES OF THE MOON'S MOTION, IN FINDING THE GREENWICH TIME CORRESPONDING TO A CORRECTED LUNAR DISTANCE.

Approximate Interval.		Difference of the Proportional Logarithms in the Ephemeris.																											
		2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56
h	m	h	m	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s
0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	10	2	50	0	0	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3
0	20	2	40	0	1	1	1	1	2	2	2	2	3	3	3	3	4	4	4	4	5	5	5	5	6	6	6	6	6
0	30	2	30	0	1	1	1	2	2	2	3	3	4	4	5	5	5	6	6	6	7	7	7	8	8	9	9	9	9
0	40	2	20	0	1	1	2	2	3	3	3	4	4	5	5	6	6	7	7	8	8	9	10	10	10	11	11	11	11
0	50	2	10	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	12	12	13	13	13
1	0	2	0	1	1	2	2	3	3	4	4	5	6	6	7	7	8	8	9	9	10	10	11	12	12	13	13	14	14
1	10	1	50	1	1	2	2	3	4	4	5	5	6	6	7	8	8	9	9	10	11	11	12	12	13	14	14	15	15
1	20	1	40	1	1	2	3	3	4	4	5	6	6	7	7	8	9	9	10	10	11	12	12	13	14	14	15	16	16
1	30	1	30	1	1	2	3	3	4	4	5	6	6	7	8	8	9	9	10	11	11	12	12	13	14	14	15	16	16

Approximate Interval.		Difference of the Proportional Logarithms in the Ephemeris.																											
		54	56	58	60	62	64	66	68	70	72	74	76	78	80	82	84	86	88	90	92	94	96	98	100	102	104	106	108
h	m	h	m	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s
0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	10	2	50	4	4	4	4	4	4	4	4	5	5	5	5	5	6	6	6	6	6	6	6	6	6	7	7	7	7
0	20	2	40	7	7	7	7	8	8	8	8	9	9	9	10	10	10	11	11	11	11	12	12	12	12	12	13	13	13
0	30	2	30	9	10	10	10	11	11	12	1	3	13	13	14	14	14	15	15	16	16	16	17	17	17	17	18	18	18
0	40	2	20	12	12	13	13	13	14	14	1	6	16	16	17	17	18	18	19	19	20	20	21	21	21	22	22	22	22
0	50	2	10	14	14	15	15	16	16	16	1	8	19	19	20	20	21	21	22	22	23	23	24	24	24	25	25	26	26
1	0	2	0	15	16	16	17	17	18	18	1	10	21	21	22	22	23	23	24	24	25	25	26	27	27	28	28	28	28
1	10	1	50	16	17	17	18	18	19	19	1	11	22	22	23	24	24	25	25	26	27	27	28	28	29	30	30	30	30
1	20	1	40	17	17	18	19	19	20	20	1	12	23	23	24	25	25	26	26	27	28	28	29	29	30	31	31	31	31
1	30	1	30	17	18	18	19	19	20	21	1	13	23	24	24	25	25	26	27	27	28	29	29	30	31	31	32	32	32

Approximate Interval.		Difference of the Proportional Logarithms in the Ephemeris.																											
		104	106	108	110	112	114	116	118	120	122	124	126	128	130	132	134	136	138	140	142	144	146	148	150	152	154	156	158
h	m	h	m	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s
0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	10	2	50	7	7	7	7	7	7	8	8	8	8	8	8	8	8	8	8	8	8	9	9	9	9	9	9	9	9
0	20	2	40	13	13	13	14	14	14	14	15	15	15	15	15	16	16	16	16	16	16	16	16	17	17	17	17	17	17
0	30	2	30	18	18	19	19	19	20	20	21	21	21	22	22	22	22	22	22	22	23	23	23	24	24	24	24	24	24
0	40	2	20	22	23	23	24	24	25	25	26	26	27	27	28	28	28	28	28	28	29	29	29	30	30	30	30	30	30
0	50	2	10	26	26	27	27	28	29	29	30	30	31	31	32	32	32	32	32	33	33	33	34	34	34	34	34	34	34
1	0	2	0	29	29	30	30	31	31	32	33	33	34	34	35	35	35	35	36	36	37	37	37	38	38	38	38	38	38
1	10	1	50	31	31	32	32	33	34	34	35	35	36	36	37	37	37	38	38	39	39	39	40	40	40	41	41	41	41
1	20	1	40	32	33	33	34	34	35	35	36	36	37	38	38	39	39	39	40	40	41	41	41	42	42	42	42	42	42
1	30	1	30	32	33	34	34	35	35	36	36	37	38	38	39	39	40	40	41	41	41	42	42	42	42	42	42	42	42

The Correction is to be added to the approximate Greenwich Time when the Proportional Logarithms in the Ephemeris are decreasing, and subtracted when they are increasing.

# TABLE II.—SIDEREAL INTO MEAN SOLAR TIME.

TO BE SUBTRACTED FROM A SIDEREAL TIME INTERVAL.										
Sidereal.	0 <sup>h</sup> .		1 <sup>h</sup> .		2 <sup>h</sup> .		3 <sup>h</sup> .		4 <sup>h</sup> .	
	m	s	m	s	m	s	m	s	m	s
0	0	0.000	0	9.830	0	19.659	0	29.489	0	39.318
1	0	0.164	0	9.993	0	19.823	0	29.653	0	39.482
2	0	0.328	0	10.157	0	19.987	0	29.816	0	39.646
3	0	0.491	0	10.321	0	20.151	0	29.980	0	39.810
4	0	0.655	0	10.485	0	20.314	0	30.144	0	39.974
5	0	0.819	0	10.649	0	20.478	0	30.308	0	40.137
6	0	0.983	0	10.813	0	20.642	0	30.472	0	40.301
7	0	1.147	0	10.976	0	20.806	0	30.635	0	40.465
8	0	1.311	0	11.140	0	20.970	0	30.799	0	40.629
9	0	1.474	0	11.304	0	21.134	0	30.963	0	40.793
10	0	1.638	0	11.468	0	21.297	0	31.127	0	40.956
11	0	1.802	0	11.632	0	21.461	0	31.291	0	41.120
12	0	1.966	0	11.795	0	21.625	0	31.455	0	41.284
13	0	2.130	0	11.959	0	21.789	0	31.618	0	41.448
14	0	2.294	0	12.123	0	21.953	0	31.782	0	41.612
15	0	2.457	0	12.287	0	22.117	0	31.946	0	41.776
16	0	2.621	0	12.451	0	22.280	0	32.110	0	41.939
17	0	2.785	0	12.615	0	22.444	0	32.274	0	42.103
18	0	2.949	0	12.778	0	22.608	0	32.438	0	42.267
19	0	3.113	0	12.942	0	22.772	0	32.601	0	42.431
20	0	3.277	0	13.106	0	22.936	0	32.765	0	42.595
21	0	3.440	0	13.270	0	23.099	0	32.929	0	42.759
22	0	3.604	0	13.434	0	23.263	0	33.093	0	42.922
23	0	3.768	0	13.598	0	23.427	0	33.257	0	43.086
24	0	3.932	0	13.761	0	23.591	0	33.420	0	43.250
25	0	4.096	0	13.925	0	23.755	0	33.584	0	43.414
26	0	4.259	0	14.089	0	23.919	0	33.748	0	43.578
27	0	4.423	0	14.253	0	24.082	0	33.912	0	43.742
28	0	4.587	0	14.417	0	24.246	0	34.076	0	43.905
29	0	4.751	0	14.581	0	24.410	0	34.240	0	44.069
30	0	4.915	0	14.744	0	24.574	0	34.403	0	44.233
31	0	5.079	0	14.908	0	24.738	0	34.567	0	44.397
32	0	5.242	0	15.072	0	24.902	0	34.731	0	44.561
33	0	5.406	0	15.236	0	25.065	0	34.895	0	44.724
34	0	5.570	0	15.400	0	25.229	0	35.059	0	44.888
35	0	5.734	0	15.563	0	25.393	0	35.223	0	45.052
36	0	5.898	0	15.727	0	25.557	0	35.386	0	45.216
37	0	6.062	0	15.891	0	25.721	0	35.550	0	45.380
38	0	6.225	0	16.055	0	25.885	0	35.714	0	45.544
39	0	6.389	0	16.219	0	26.048	0	35.878	0	45.707
40	0	6.553	0	16.383	0	26.212	0	36.042	0	45.871
41	0	6.717	0	16.546	0	26.376	0	36.206	0	46.035
42	0	6.881	0	16.710	0	26.540	0	36.369	0	46.199
43	0	7.045	0	16.874	0	26.704	0	36.533	0	46.363
44	0	7.208	0	17.038	0	26.867	0	36.697	0	46.527
45	0	7.372	0	17.202	0	27.031	0	36.861	0	46.690
46	0	7.536	0	17.366	0	27.195	0	37.025	0	46.854
47	0	7.700	0	17.529	0	27.359	0	37.188	0	47.018
48	0	7.864	0	17.693	0	27.523	0	37.352	0	47.182
49	0	8.027	0	17.857	0	27.687	0	37.516	0	47.346
50	0	8.191	0	18.021	0	27.850	0	37.680	0	47.510
51	0	8.355	0	18.185	0	28.014	0	37.844	0	47.673
52	0	8.519	0	18.349	0	28.178	0	38.008	0	47.837
53	0	8.683	0	18.512	0	28.342	0	38.171	0	48.001
54	0	8.847	0	18.676	0	28.506	0	38.335	0	48.165
55	0	9.010	0	18.840	0	28.670	0	38.499	0	48.329
56	0	9.174	0	19.004	0	28.833	0	38.663	0	48.492
57	0	9.338	0	19.168	0	28.997	0	38.827	0	48.656
58	0	9.502	0	19.331	0	29.161	0	38.991	0	48.820
59	0	9.666	0	19.495	0	29.325	0	39.154	0	48.984
										For Seconds.
										s
										s
										0.003
										.005
										.008
										.011
										.014
										.016
										.019
										.022
										.025
										.027
										.030
										.033
										.035
										.038
										.041
										.044
										.046
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										.052
										.055
										.057
										.060
										.063
										.066
										.068
										.071
										.074
										.076
										.079
										.082
										.085
										.087
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										.131
										.134
										.137
										.139
										.142
										.145
										.147
										.150
										.153
										.156
										.158
										0.161

# TABLE II.—SIDEREAL INTO MEAN SOLAR TIME.

TO BE SUBTRACTED FROM A SIDEREAL TIME INTERVAL.										
Sidereal.	8 <sup>h</sup> .	9 <sup>h</sup> .	10 <sup>h</sup> .	11 <sup>h</sup> .	12 <sup>h</sup> .	13 <sup>h</sup> .	14 <sup>h</sup> .	15 <sup>h</sup> .	For Seconds.	
m	m	m	m	m	m	m	m	m	s	s
0	1 18.636	1 28.466	1 38.296	1 48.125	1 57.955	2 7.784	2 17.614	2 27.443		
1	1 18.800	1 28.630	1 38.459	1 48.289	1 58.119	2 7.948	2 17.778	2 27.607	1	0.003
2	1 18.964	1 28.794	1 38.623	1 48.453	1 58.282	2 8.112	2 17.941	2 27.771	2	.005
3	1 19.128	1 28.958	1 38.787	1 48.617	1 58.446	2 8.276	2 18.105	2 27.935	3	.008
4	1 19.292	1 29.121	1 38.951	1 48.780	1 58.610	2 8.440	2 18.269	2 28.099	4	.011
5	1 19.456	1 29.285	1 39.115	1 48.944	1 58.774	2 8.603	2 18.433	2 28.263	5	.014
6	1 19.619	1 29.449	1 39.279	1 49.108	1 58.938	2 8.767	2 18.597	2 28.426	6	.016
7	1 19.783	1 29.613	1 39.442	1 49.272	1 59.101	2 8.931	2 18.761	2 28.590	7	.019
8	1 19.947	1 29.777	1 39.606	1 49.436	1 59.265	2 9.095	2 18.925	2 28.754	8	.022
9	1 20.111	1 29.940	1 39.770	1 49.600	1 59.429	2 9.259	2 19.088	2 28.918	9	.025
10	1 20.275	1 30.104	1 39.934	1 49.763	1 59.593	2 9.423	2 19.252	2 29.082	10	.027
11	1 20.439	1 30.268	1 40.098	1 49.927	1 59.757	2 9.586	2 19.416	2 29.245	11	.030
12	1 20.602	1 30.432	1 40.261	1 50.091	1 59.921	2 9.750	2 19.580	2 29.409	12	.033
13	1 20.766	1 30.596	1 40.425	1 50.255	2 0.084	2 9.914	2 19.744	2 29.573	13	.035
14	1 20.930	1 30.760	1 40.589	1 50.419	2 0.248	2 10.078	2 19.907	2 29.737	14	.038
15	1 21.094	1 30.923	1 40.753	1 50.583	2 0.412	2 10.242	2 20.071	2 29.901	15	.041
16	1 21.258	1 31.087	1 40.917	1 50.746	2 0.576	2 10.405	2 20.235	2 30.065	16	.044
17	1 21.422	1 31.251	1 41.081	1 50.910	2 0.740	2 10.569	2 20.399	2 30.228	17	.046
18	1 21.585	1 31.415	1 41.244	1 51.074	2 0.904	2 10.733	2 20.563	2 30.392	18	.049
19	1 21.749	1 31.579	1 41.408	1 51.238	2 1.067	2 10.897	2 20.727	2 30.556	19	.052
20	1 21.913	1 31.743	1 41.572	1 51.402	2 1.231	2 11.061	2 20.890	2 30.720	20	.055
21	1 22.077	1 31.906	1 41.736	1 51.565	2 1.395	2 11.225	2 21.054	2 30.884	21	.057
22	1 22.241	1 32.070	1 41.900	1 51.729	2 1.559	2 11.388	2 21.218	2 31.048	22	.060
23	1 22.404	1 32.234	1 42.064	1 51.893	2 1.723	2 11.552	2 21.382	2 31.211	23	.063
24	1 22.568	1 32.398	1 42.227	1 52.057	2 1.887	2 11.716	2 21.546	2 31.375	24	.066
25	1 22.732	1 32.562	1 42.391	1 52.221	2 2.050	2 11.880	2 21.709	2 31.539	25	.068
26	1 22.896	1 32.726	1 42.555	1 52.385	2 2.214	2 12.044	2 21.873	2 31.703	26	.071
27	1 23.060	1 32.889	1 42.719	1 52.548	2 2.378	2 12.208	2 22.037	2 31.867	27	.074
28	1 23.224	1 33.053	1 42.883	1 52.712	2 2.542	2 12.371	2 22.201	2 32.031	28	.076
29	1 23.387	1 33.217	1 43.047	1 52.876	2 2.706	2 12.535	2 22.365	2 32.194	29	.079
30	1 23.551	1 33.381	1 43.210	1 53.040	2 2.869	2 12.699	2 22.529	2 32.358	30	.082
31	1 23.715	1 33.545	1 43.374	1 53.204	2 3.033	2 12.863	2 22.692	2 32.522	31	.085
32	1 23.879	1 33.708	1 43.538	1 53.368	2 3.197	2 13.027	2 22.856	2 32.686	32	.087
33	1 24.043	1 33.872	1 43.702	1 53.531	2 3.361	2 13.191	2 23.020	2 32.850	33	.090
34	1 24.207	1 34.036	1 43.866	1 53.695	2 3.525	2 13.354	2 23.184	2 33.013	34	.093
35	1 24.370	1 34.200	1 44.029	1 53.859	2 3.689	2 13.518	2 23.348	2 33.177	35	.096
36	1 24.534	1 34.364	1 44.193	1 54.023	2 3.852	2 13.682	2 23.512	2 33.341	36	.098
37	1 24.698	1 34.528	1 44.357	1 54.187	2 4.016	2 13.846	2 23.675	2 33.505	37	.101
38	1 24.862	1 34.691	1 44.521	1 54.351	2 4.180	2 14.010	2 23.839	2 33.669	38	.104
39	1 25.026	1 31.855	1 44.635	1 54.514	2 4.344	2 14.173	2 24.003	2 33.833	39	.106
40	1 25.190	1 35.019	1 44.849	1 54.678	2 4.508	2 14.337	2 24.167	2 33.996	40	.109
41	1 25.353	1 35.183	1 45.012	1 54.842	2 4.672	2 14.501	2 24.331	2 34.160	41	.112
42	1 25.517	1 35.347	1 45.176	1 55.006	2 4.835	2 14.665	2 24.495	2 34.324	42	.115
43	1 25.681	1 35.511	1 45.340	1 55.170	2 4.999	2 14.829	2 24.658	2 34.488	43	.117
44	1 25.845	1 35.674	1 45.504	1 55.333	2 5.163	2 14.993	2 24.822	2 34.652	44	.120
45	1 26.009	1 35.838	1 45.668	1 55.497	2 5.327	2 15.156	2 24.986	2 34.816	45	.123
46	1 26.172	1 36.002	1 45.832	1 55.661	2 5.491	2 15.320	2 25.150	2 34.979	46	.126
47	1 26.336	1 36.166	1 45.995	1 55.825	2 5.655	2 15.484	2 25.314	2 35.143	47	.128
48	1 26.500	1 36.330	1 46.159	1 55.989	2 5.818	2 15.648	2 25.477	2 35.307	48	.131
49	1 26.664	1 36.493	1 46.323	1 56.153	2 5.982	2 15.812	2 25.641	2 35.471	49	.134
50	1 26.828	1 36.657	1 46.487	1 56.316	2 6.146	2 15.976	2 25.805	2 35.635	50	.137
51	1 26.992	1 36.821	1 46.651	1 56.480	2 6.310	2 16.139	2 25.969	2 35.798	51	.139
52	1 27.155	1 36.985	1 46.815	1 56.644	2 6.474	2 16.303	2 26.133	2 35.962	52	.142
53	1 27.319	1 37.149	1 46.978	1 56.808	2 6.637	2 16.467	2 26.297	2 36.126	53	.145
54	1 27.483	1 37.313	1 47.142	1 56.972	2 6.801	2 16.631	2 26.460	2 36.290	54	.147
55	1 27.647	1 37.476	1 47.306	1 57.136	2 6.965	2 16.795	2 26.624	2 36.454	55	.150
56	1 27.811	1 37.640	1 47.470	1 57.299	2 7.129	2 16.959	2 26.788	2 36.618	56	.153
57	1 27.975	1 37.804	1 47.634	1 57.463	2 7.293	2 17.122	2 26.952	2 36.781	57	.156
58	1 28.138	1 37.968	1 47.797	1 57.627	2 7.457	2 17.286	2 27.116	2 36.945	58	.158
59	1 28.302	1 38.132	1 47.961	1 57.791	2 7.620	2 17.450	2 27.280	2 37.109	59	0.161

# TABLE II.—SIDEREAL INTO MEAN SOLAR TIME.

TO BE SUBTRACTED FROM A SIDEREAL TIME INTERVAL.										
Side- real.	16 <sup>h</sup> .	17 <sup>h</sup> .	18 <sup>h</sup> .	19 <sup>h</sup> .	20 <sup>h</sup> .	21 <sup>h</sup> .	22 <sup>h</sup> .	23 <sup>h</sup> .	For Seconds.	
m	m	m	m	m	m	m	m	m	s	s
0	2 37.273	2 47.102	2 56.932	3 6.762	3 16.591	3 26.421	3 36.250	3 46.080		
1	2 37.437	2 47.266	2 57.096	3 6.925	3 16.755	3 26.585	3 36.414	3 46.244	1	0.003
2	2 37.601	2 47.430	2 57.260	3 7.089	3 16.919	3 26.748	3 36.578	3 46.407	2	.005
3	2 37.764	2 47.594	2 57.424	3 7.253	3 17.083	3 26.912	3 36.742	3 46.571	3	.008
4	2 37.928	2 47.758	2 57.587	3 7.417	3 17.246	3 27.076	3 36.906	3 46.735	4	.011
5	2 38.092	2 47.922	2 57.751	3 7.581	3 17.410	3 27.240	3 37.069	3 46.899	5	.014
6	2 38.256	2 48.085	2 57.915	3 7.745	3 17.574	3 27.404	3 37.233	3 47.063	6	.016
7	2 38.420	2 48.249	2 58.079	3 7.908	3 17.738	3 27.568	3 37.397	3 47.227	7	.019
8	2 38.584	2 48.413	2 58.243	3 8.072	3 17.902	3 27.731	3 37.561	3 47.390	8	.022
9	2 38.747	2 48.577	2 58.406	3 8.236	3 18.066	3 27.895	3 37.725	3 47.554	9	.025
10	2 38.911	2 48.741	2 58.570	3 8.400	3 18.229	3 28.059	3 37.889	3 47.718	10	.027
11	2 39.075	2 48.905	2 58.734	3 8.564	3 18.393	3 28.223	3 38.052	3 47.882	11	.030
12	2 39.239	2 49.068	2 58.898	3 8.728	3 18.557	3 28.387	3 38.216	3 48.046	12	.033
13	2 39.403	2 49.232	2 59.062	3 8.891	3 18.721	3 28.550	3 38.380	3 48.210	13	.035
14	2 39.566	2 49.396	2 59.226	3 9.055	3 18.885	3 28.714	3 38.544	3 48.373	14	.038
15	2 39.730	2 49.560	2 59.389	3 9.219	3 19.049	3 28.878	3 38.708	3 48.537	15	.041
16	2 39.894	2 49.724	2 59.553	3 9.383	3 19.212	3 29.042	3 38.871	3 48.701	16	.044
17	2 40.058	2 49.888	2 59.717	3 9.547	3 19.376	3 29.206	3 39.035	3 48.865	17	.046
18	2 40.222	2 50.051	2 59.881	3 9.710	3 19.540	3 29.370	3 39.199	3 49.029	18	.049
19	2 40.386	2 50.215	3 0.045	3 9.874	3 19.704	3 29.533	3 39.363	3 49.193	19	.052
20	2 40.549	2 50.379	3 0.209	3 10.038	3 19.868	3 29.697	3 39.527	3 49.356	20	.055
21	2 40.713	2 50.543	3 0.372	3 10.202	3 20.032	3 29.861	3 39.691	3 49.520	21	.057
22	2 40.877	2 50.707	3 0.536	3 10.366	3 20.195	3 30.025	3 39.854	3 49.684	22	.060
23	2 41.041	2 50.870	3 0.700	3 10.530	3 20.359	3 30.189	3 40.018	3 49.848	23	.063
24	2 41.205	2 51.034	3 0.864	3 10.693	3 20.523	3 30.353	3 40.182	3 50.012	24	.066
25	2 41.369	2 51.198	3 1.028	3 10.857	3 20.687	3 30.516	3 40.346	3 50.175	25	.068
26	2 41.532	2 51.362	3 1.192	3 11.021	3 20.851	3 30.680	3 40.510	3 50.339	26	.071
27	2 41.696	2 51.526	3 1.355	3 11.185	3 21.014	3 30.844	3 40.674	3 50.503	27	.074
28	2 41.860	2 51.690	3 1.519	3 11.349	3 21.178	3 31.008	3 40.837	3 50.667	28	.076
29	2 42.024	2 51.853	3 1.683	3 11.513	3 21.342	3 31.172	3 41.001	3 50.831	29	.079
30	2 42.188	2 52.017	3 1.847	3 11.676	3 21.506	3 31.336	3 41.165	3 50.995	30	.082
31	2 42.352	2 52.181	3 2.011	3 11.840	3 21.670	3 31.499	3 41.329	3 51.158	31	.085
32	2 42.515	2 52.345	3 2.174	3 12.004	3 21.834	3 31.663	3 41.493	3 51.322	32	.087
33	2 42.679	2 52.509	3 2.338	3 12.168	3 21.997	3 31.827	3 41.657	3 51.486	33	.090
34	2 42.843	2 52.673	3 2.502	3 12.332	3 22.161	3 31.991	3 41.820	3 51.650	34	.093
35	2 43.007	2 52.836	3 2.666	3 12.496	3 22.325	3 32.155	3 41.984	3 51.814	35	.096
36	2 43.171	2 53.000	3 2.830	3 12.659	3 22.489	3 32.318	3 42.148	3 51.978	36	.098
37	2 43.334	2 53.164	3 2.994	3 12.823	3 22.653	3 32.482	3 42.312	3 52.141	37	.101
38	2 43.498	2 53.328	3 3.157	3 12.987	3 22.817	3 32.646	3 42.476	3 52.305	38	.104
39	2 43.662	2 53.492	3 3.321	3 13.151	3 22.980	3 32.810	3 42.639	3 52.469	39	.106
40	2 43.826	2 53.656	3 3.485	3 13.315	3 23.144	3 32.974	3 42.803	3 52.633	40	.109
41	2 43.990	2 53.819	3 3.649	3 13.478	3 23.308	3 33.138	3 42.967	3 52.797	41	.112
42	2 44.154	2 53.983	3 3.813	3 13.642	3 23.472	3 33.301	3 43.131	3 52.961	42	.115
43	2 44.317	2 54.147	3 3.977	3 13.806	3 23.636	3 33.465	3 43.295	3 53.124	43	.117
44	2 44.481	2 54.311	3 4.140	3 13.970	3 23.800	3 33.629	3 43.459	3 53.288	44	.120
45	2 44.645	2 54.475	3 4.304	3 14.134	3 23.963	3 33.793	3 43.622	3 53.452	45	.123
46	2 44.809	2 54.638	3 4.468	3 14.298	3 24.127	3 33.957	3 43.786	3 53.616	46	.126
47	2 44.973	2 54.802	3 4.632	3 14.461	3 24.291	3 34.121	3 43.950	3 53.780	47	.128
48	2 45.137	2 54.966	3 4.796	3 14.625	3 24.455	3 34.284	3 44.114	3 53.943	48	.131
49	2 45.300	2 55.130	3 4.960	3 14.789	3 24.619	3 34.448	3 44.278	3 54.107	49	.134
50	2 45.464	2 55.294	3 5.123	3 14.953	3 24.782	3 34.612	3 44.442	3 54.271	50	.137
51	2 45.628	2 55.458	3 5.287	3 15.117	3 24.946	3 34.776	3 44.605	3 54.435	51	.139
52	2 45.792	2 55.621	3 5.451	3 15.281	3 25.110	3 34.940	3 44.769	3 54.599	52	.142
53	2 45.956	2 55.785	3 5.615	3 15.444	3 25.274	3 35.104	3 44.933	3 54.763	53	.145
54	2 46.120	2 55.949	3 5.779	3 15.608	3 25.438	3 35.267	3 45.097	3 54.926	54	.147
55	2 46.283	2 56.113	3 5.942	3 15.772	3 25.602	3 35.431	3 45.261	3 55.090	55	.150
56	2 46.447	2 56.277	3 6.106	3 15.936	3 25.765	3 35.595	3 45.425	3 55.254	56	.153
57	2 46.611	2 56.441	3 6.270	3 16.100	3 25.929	3 35.759	3 45.588	3 55.418	57	.156
58	2 46.775	2 56.604	3 6.434	3 16.264	3 26.093	3 35.923	3 45.752	3 55.582	58	.158
59	2 46.939	2 56.768	3 6.598	3 16.427	3 26.257	3 36.086	3 45.916	3 55.746	59	.161

# TABLE III.—MEAN SOLAR INTO SIDEREAL TIME.

TO BE ADDED TO A MEAN TIME INTERVAL.

Mean Solar.	0 <sup>h</sup> .	1 <sup>h</sup> .	2 <sup>h</sup> .	3 <sup>h</sup> .	4 <sup>h</sup> .	5 <sup>h</sup> .	6 <sup>h</sup> .	7 <sup>h</sup> .	For Seconds.	
m	m	m	m	m	m	m	m	m	s	s
0	0	0.000	0 9.856	0 19.713	0 29.569	0 39.426	0 49.282	0 59.139	1 8.985	
1	0	0.164	0 10.021	0 19.877	0 29.734	0 39.590	0 49.447	0 59.303	1 9.160	1 0.003
2	0	0.329	0 10.185	0 20.041	0 29.898	0 39.754	0 49.611	0 59.467	1 9.324	2 .005
3	0	0.493	0 10.349	0 20.206	0 30.062	0 39.919	0 49.775	0 59.632	1 9.488	3 .008
4	0	0.657	0 10.514	0 20.370	0 30.227	0 40.083	0 49.939	0 59.796	1 9.652	4 .011
5	0	0.821	0 10.678	0 20.534	0 30.391	0 40.247	0 50.104	0 59.960	1 9.817	5 .014
6	0	0.986	0 10.842	0 20.699	0 30.555	0 40.412	0 50.268	1 0.124	1 9.981	6 .016
7	0	1.150	0 11.006	0 20.863	0 30.719	0 40.576	0 50.432	1 0.289	1 10.145	7 .019
8	0	1.314	0 11.171	0 21.027	0 30.884	0 40.740	0 50.597	1 0.453	1 10.310	8 .022
9	0	1.478	0 11.335	0 21.191	0 31.048	0 40.904	0 50.761	1 0.617	1 10.474	9 .025
10	0	1.643	0 11.499	0 21.356	0 31.212	0 41.069	0 50.925	1 0.782	1 10.638	10 .027
11	0	1.807	0 11.663	0 21.520	0 31.376	0 41.233	0 51.089	1 0.946	1 10.802	11 .030
12	0	1.971	0 11.828	0 21.684	0 31.541	0 41.397	0 51.254	1 1.110	1 10.967	12 .033
13	0	2.136	0 11.992	0 21.849	0 31.705	0 41.561	0 51.418	1 1.274	1 11.131	13 .036
14	0	2.300	0 12.156	0 22.013	0 31.869	0 41.726	0 51.582	1 1.439	1 11.295	14 .038
15	0	2.464	0 12.321	0 22.177	0 32.034	0 41.890	0 51.746	1 1.603	1 11.459	15 .041
16	0	2.628	0 12.485	0 22.341	0 32.198	0 42.054	0 51.911	1 1.767	1 11.624	16 .044
17	0	2.793	0 12.649	0 22.506	0 32.362	0 42.219	0 52.075	1 1.932	1 11.788	17 .047
18	0	2.957	0 12.813	0 22.670	0 32.526	0 42.383	0 52.239	1 2.096	1 11.952	18 .049
19	0	3.121	0 12.978	0 22.834	0 32.691	0 42.547	0 52.404	1 2.260	1 12.117	19 .052
20	0	3.285	0 13.142	0 22.998	0 32.855	0 42.711	0 52.568	1 2.424	1 12.281	20 .055
21	0	3.450	0 13.306	0 23.163	0 33.019	0 42.876	0 52.732	1 2.589	1 12.445	21 .057
22	0	3.614	0 13.471	0 23.327	0 33.183	0 43.040	0 52.896	1 2.753	1 12.609	22 .060
23	0	3.778	0 13.635	0 23.491	0 33.348	0 43.204	0 53.061	1 2.917	1 12.774	23 .063
24	0	3.943	0 13.799	0 23.656	0 33.512	0 43.368	0 53.225	1 3.081	1 12.938	24 .066
25	0	4.107	0 13.963	0 23.820	0 33.676	0 43.533	0 53.389	1 3.246	1 13.102	25 .068
26	0	4.271	0 14.128	0 23.984	0 33.841	0 43.697	0 53.554	1 3.410	1 13.266	26 .071
27	0	4.435	0 14.292	0 24.148	0 34.005	0 43.861	0 53.718	1 3.574	1 13.431	27 .074
28	0	4.600	0 14.456	0 24.313	0 34.169	0 44.026	0 53.882	1 3.739	1 13.595	28 .077
29	0	4.764	0 14.620	0 24.477	0 34.333	0 44.190	0 54.046	1 3.903	1 13.759	29 .079
30	0	4.928	0 14.785	0 24.641	0 34.498	0 44.354	0 54.211	1 4.067	1 13.924	30 .082
31	0	5.093	0 14.949	0 24.805	0 34.662	0 44.518	0 54.375	1 4.231	1 14.088	31 .085
32	0	5.257	0 15.113	0 24.970	0 34.826	0 44.683	0 54.539	1 4.396	1 14.252	32 .088
33	0	5.421	0 15.278	0 25.134	0 34.990	0 44.847	0 54.703	1 4.560	1 14.416	33 .090
34	0	5.585	0 15.442	0 25.298	0 35.155	0 45.011	0 54.868	1 4.724	1 14.581	34 .093
35	0	5.750	0 15.606	0 25.463	0 35.319	0 45.176	0 55.032	1 4.888	1 14.745	35 .096
36	0	5.914	0 15.770	0 25.627	0 35.483	0 45.340	0 55.196	1 5.053	1 14.909	36 .099
37	0	6.078	0 15.935	0 25.791	0 35.648	0 45.504	0 55.361	1 5.217	1 15.073	37 .101
38	0	6.242	0 16.099	0 25.955	0 35.812	0 45.668	0 55.525	1 5.381	1 15.238	38 .104
39	0	6.407	0 16.263	0 26.120	0 35.976	0 45.833	0 55.689	1 5.546	1 15.402	39 .107
40	0	6.571	0 16.427	0 26.284	0 36.140	0 45.997	0 55.853	1 5.710	1 15.566	40 .110
41	0	6.735	0 16.592	0 26.448	0 36.305	0 46.161	0 56.018	1 5.874	1 15.731	41 .112
42	0	6.900	0 16.756	0 26.612	0 36.469	0 46.325	0 56.182	1 6.038	1 15.895	42 .115
43	0	7.064	0 16.920	0 26.777	0 36.633	0 46.490	0 56.346	1 6.203	1 16.059	43 .118
44	0	7.228	0 17.085	0 26.941	0 36.798	0 46.654	0 56.510	1 6.367	1 16.223	44 .120
45	0	7.392	0 17.249	0 27.105	0 36.962	0 46.818	0 56.675	1 6.531	1 16.388	45 .123
46	0	7.557	0 17.413	0 27.270	0 37.126	0 46.983	0 56.839	1 6.695	1 16.552	46 .126
47	0	7.721	0 17.577	0 27.434	0 37.290	0 47.147	0 57.003	1 6.860	1 16.716	47 .129
48	0	7.885	0 17.742	0 27.598	0 37.455	0 47.311	0 57.168	1 7.024	1 16.881	48 .131
49	0	8.049	0 17.906	0 27.762	0 37.619	0 47.475	0 57.332	1 7.188	1 17.045	49 .134
50	0	8.214	0 18.070	0 27.927	0 37.783	0 47.640	0 57.496	1 7.353	1 17.209	50 .137
51	0	8.378	0 18.234	0 28.091	0 37.947	0 47.804	0 57.660	1 7.517	1 17.373	51 .140
52	0	8.542	0 18.399	0 28.255	0 38.112	0 47.968	0 57.825	1 7.681	1 17.538	52 .142
53	0	8.707	0 18.563	0 28.420	0 38.276	0 48.132	0 57.989	1 7.845	1 17.702	53 .145
54	0	8.871	0 18.727	0 28.584	0 38.440	0 48.297	0 58.153	1 8.010	1 17.866	54 .148
55	0	9.035	0 18.892	0 28.748	0 38.605	0 48.461	0 58.317	1 8.174	1 18.030	55 .151
56	0	9.199	0 19.056	0 28.912	0 38.769	0 48.625	0 58.482	1 8.338	1 18.195	56 .153
57	0	9.364	0 19.220	0 29.077	0 38.933	0 48.790	0 58.646	1 8.502	1 18.359	57 .156
58	0	9.528	0 19.384	0 29.241	0 39.097	0 48.954	0 58.810	1 8.667	1 18.523	58 .159
59	0	9.692	0 19.549	0 29.405	0 39.262	0 49.118	0 58.975	1 8.831	1 18.688	59 0.162

# TABLE III.—MEAN SOLAR INTO SIDEREAL TIME.

TO BE ADDED TO A MEAN TIME INTERVAL.									
Mean Solar.	8 <sup>h</sup> .	9 <sup>h</sup> .	10 <sup>h</sup> .	11 <sup>h</sup> .	12 <sup>h</sup> .	13 <sup>h</sup> .	14 <sup>h</sup> .	15 <sup>h</sup> .	For Seconds.
0	m 18.852	m 28.708	m 38.565	m 48.421	m 58.278	m 8.134	m 17.991	m 27.847	
1	1 19.016	1 28.873	1 38.729	1 48.585	1 58.442	2 8.298	2 18.155	2 28.011	1 0.003
2	1 19.180	1 29.037	1 38.893	1 48.750	1 58.606	2 8.463	2 18.319	2 28.176	2 .005
3	1 19.345	1 29.201	1 39.058	1 48.914	1 58.771	2 8.627	2 18.483	2 28.340	3 .008
4	1 19.509	1 29.365	1 39.222	1 49.078	1 58.935	2 8.791	2 18.648	2 28.504	4 .011
5	1 19.673	1 29.530	1 39.386	1 49.243	1 59.099	2 8.956	2 18.812	2 28.668	5 .014
6	1 19.837	1 29.694	1 39.550	1 49.407	1 59.263	2 9.120	2 18.976	2 28.833	6 .016
7	1 20.002	1 29.858	1 39.715	1 49.571	1 59.428	2 9.284	2 19.141	2 28.997	7 .019
8	1 20.166	1 30.022	1 39.879	1 49.735	1 59.592	2 9.448	2 19.305	2 29.161	8 .022
9	1 20.330	1 30.187	1 40.043	1 49.900	1 59.756	2 9.613	2 19.469	2 29.326	9 .025
10	1 20.495	1 30.351	1 40.207	1 50.064	1 59.920	2 9.777	2 19.633	2 29.490	10 .027
11	1 20.659	1 30.515	1 40.372	1 50.228	2 0.085	2 9.941	2 19.798	2 29.654	11 .030
12	1 20.823	1 30.680	1 40.536	1 50.393	2 0.249	2 10.105	2 19.962	2 29.818	12 .033
13	1 20.987	1 30.844	1 40.700	1 50.557	2 0.413	2 10.270	2 20.126	2 29.983	13 .036
14	1 21.152	1 31.008	1 40.865	1 50.721	2 0.578	2 10.434	2 20.290	2 30.147	14 .038
15	1 21.316	1 31.172	1 41.029	1 50.885	2 0.742	2 10.598	2 20.455	2 30.311	15 .041
16	1 21.480	1 31.337	1 41.193	1 51.050	2 0.906	2 10.763	2 20.619	2 30.476	16 .044
17	1 21.644	1 31.501	1 41.357	1 51.214	2 1.070	2 10.927	2 20.783	2 30.640	17 .047
18	1 21.809	1 31.665	1 41.522	1 51.378	2 1.235	2 11.091	2 20.948	2 30.804	18 .049
19	1 21.973	1 31.829	1 41.686	1 51.542	2 1.399	2 11.255	2 21.112	2 30.968	19 .052
20	1 22.137	1 31.994	1 41.850	1 51.707	2 1.563	2 11.420	2 21.276	2 31.133	20 .055
21	1 22.302	1 32.158	1 42.015	1 51.871	2 1.727	2 11.584	2 21.440	2 31.297	21 .057
22	1 22.466	1 32.322	1 42.179	1 52.035	2 1.892	2 11.748	2 21.605	2 31.461	22 .060
23	1 22.630	1 32.487	1 42.343	1 52.200	2 2.056	2 11.912	2 21.769	2 31.625	23 .063
24	1 22.794	1 32.651	1 42.507	1 52.364	2 2.220	2 12.077	2 21.933	2 31.790	24 .066
25	1 22.959	1 32.815	1 42.672	1 52.528	2 2.385	2 12.241	2 22.098	2 31.954	25 .068
26	1 23.123	1 32.979	1 42.836	1 52.692	2 2.549	2 12.405	2 22.262	2 32.118	26 .071
27	1 23.287	1 33.144	1 43.000	1 52.857	2 2.713	2 12.570	2 22.426	2 32.283	27 .074
28	1 23.451	1 33.308	1 43.164	1 53.021	2 2.877	2 12.734	2 22.590	2 32.447	28 .077
29	1 23.616	1 33.472	1 43.329	1 53.185	2 3.042	2 12.898	2 22.755	2 32.611	29 .079
30	1 23.780	1 33.637	1 43.493	1 53.349	2 3.206	2 13.062	2 22.919	2 32.775	30 .082
31	1 23.944	1 33.801	1 43.657	1 53.514	2 3.370	2 13.227	2 23.083	2 32.940	31 .085
32	1 24.109	1 33.965	1 43.822	1 53.678	2 3.534	2 13.391	2 23.247	2 33.104	32 .088
33	1 24.273	1 34.129	1 43.986	1 53.842	2 3.699	2 13.555	2 23.412	2 33.268	33 .090
34	1 24.437	1 34.294	1 44.150	1 54.007	2 3.863	2 13.720	2 23.576	2 33.432	34 .093
35	1 24.601	1 34.458	1 44.314	1 54.171	2 4.027	2 13.884	2 23.740	2 33.597	35 .096
36	1 24.766	1 34.622	1 44.479	1 54.335	2 4.192	2 14.048	2 23.905	2 33.761	36 .099
37	1 24.930	1 34.786	1 44.643	1 54.499	2 4.356	2 14.212	2 24.069	2 33.925	37 .101
38	1 25.094	1 34.951	1 44.807	1 54.664	2 4.520	2 14.377	2 24.233	2 34.090	38 .104
39	1 25.259	1 35.115	1 44.971	1 54.828	2 4.684	2 14.541	2 24.397	2 34.254	39 .107
40	1 25.423	1 35.279	1 45.136	1 54.992	2 4.849	2 14.705	2 24.562	2 34.418	40 .110
41	1 25.587	1 35.444	1 45.300	1 55.156	2 5.013	2 14.869	2 24.726	2 34.582	41 .112
42	1 25.751	1 35.608	1 45.464	1 55.321	2 5.177	2 15.034	2 24.890	2 34.747	42 .115
43	1 25.916	1 35.772	1 45.629	1 55.485	2 5.342	2 15.198	2 25.054	2 34.911	43 .118
44	1 26.080	1 35.936	1 45.793	1 55.649	2 5.506	2 15.362	2 25.219	2 35.075	44 .120
45	1 26.244	1 36.101	1 45.957	1 55.814	2 5.670	2 15.527	2 25.383	2 35.239	45 .123
46	1 26.408	1 36.265	1 46.121	1 55.978	2 5.834	2 15.691	2 25.547	2 35.404	46 .126
47	1 26.573	1 36.429	1 46.286	1 56.142	2 5.999	2 15.855	2 25.712	2 35.568	47 .129
48	1 26.737	1 36.593	1 46.450	1 56.306	2 6.163	2 16.019	2 25.876	2 35.732	48 .131
49	1 26.901	1 36.758	1 46.614	1 56.471	2 6.327	2 16.184	2 26.040	2 35.897	49 .134
50	1 27.066	1 36.922	1 46.778	1 56.635	2 6.491	2 16.348	2 26.204	2 36.061	50 .137
51	1 27.230	1 37.086	1 46.943	1 56.799	2 6.656	2 16.512	2 26.369	2 36.225	51 .140
52	1 27.394	1 37.251	1 47.107	1 56.964	2 6.820	2 16.676	2 26.533	2 36.389	52 .142
53	1 27.558	1 37.415	1 47.271	1 57.128	2 6.984	2 16.841	2 26.697	2 36.554	53 .145
54	1 27.723	1 37.579	1 47.436	1 57.292	2 7.149	2 17.005	2 26.861	2 36.718	54 .148
55	1 27.887	1 37.743	1 47.600	1 57.456	2 7.313	2 17.169	2 27.026	2 36.882	55 .151
56	1 28.051	1 37.908	1 47.764	1 57.621	2 7.477	2 17.334	2 27.190	2 37.047	56 .153
57	1 28.215	1 38.072	1 47.928	1 57.785	2 7.641	2 17.498	2 27.354	2 37.211	57 .156
58	1 28.380	1 38.236	1 48.093	1 57.949	2 7.806	2 17.662	2 27.519	2 37.375	58 .159
59	1 28.544	1 38.400	1 48.257	1 58.113	2 7.970	2 17.826	2 27.683	2 37.539	59 0.162

# TABLE III.—MEAN SOLAR INTO SIDEREAL TIME.

TO BE ADDED TO A MEAN TIME INTERVAL.									
Mean Solar.	16 <sup>h</sup> .	17 <sup>h</sup> .	18 <sup>h</sup> .	19 <sup>h</sup> .	20 <sup>h</sup> .	21 <sup>h</sup> .	22 <sup>h</sup> .	23 <sup>h</sup> .	For Seconds.
m	m	m	m	m	m	m	m	m	s
0	2 37.704	2 47.560	2 57.417	3 7.273	3 17.129	3 26.986	3 36.842	3 46.699	1 0.003
1	2 37.868	2 47.724	2 57.581	3 7.437	3 17.294	3 27.150	3 37.007	3 46.863	1 .005
2	2 38.032	2 47.889	2 57.745	3 7.602	3 17.458	3 27.315	3 37.171	3 47.027	2 .008
3	2 38.196	2 48.053	2 57.909	3 7.766	3 17.622	3 27.479	3 37.335	3 47.192	3 .011
4	2 38.361	2 48.217	2 58.074	3 7.930	3 17.787	3 27.643	3 37.500	3 47.356	4 .014
5	2 38.525	2 48.381	2 58.238	3 8.094	3 17.951	3 27.807	3 37.664	3 47.520	5 .016
6	2 38.689	2 48.546	2 58.402	3 8.259	3 18.115	3 27.972	3 37.828	3 47.685	6 .019
7	2 38.854	2 48.710	2 58.566	3 8.423	3 18.279	3 28.136	3 37.992	3 47.849	7 .022
8	2 39.018	2 48.874	2 58.731	3 8.587	3 18.444	3 28.300	3 38.157	3 48.013	8 .025
9	2 39.182	2 49.039	2 58.895	3 8.751	3 18.608	3 28.464	3 38.321	3 48.177	9 .027
10	2 39.346	2 49.203	2 59.059	3 8.916	3 18.772	3 28.629	3 38.485	3 48.342	10 .030
11	2 39.511	2 49.367	2 59.224	3 9.080	3 18.937	3 28.793	3 38.649	3 48.506	11 .033
12	2 39.675	2 49.531	2 59.388	3 9.244	3 19.101	3 28.957	3 38.814	3 48.670	12 .036
13	2 39.839	2 49.696	2 59.552	3 9.409	3 19.265	3 29.122	3 38.978	3 48.834	13 .038
14	2 40.003	2 49.860	2 59.716	3 9.573	3 19.429	3 29.286	3 39.142	3 48.999	14 .041
15	2 40.168	2 50.024	2 59.881	3 9.737	3 19.594	3 29.450	3 39.307	3 49.163	15 .044
16	2 40.332	2 50.188	3 0.045	3 9.901	3 19.758	3 29.614	3 39.471	3 49.327	16 .047
17	2 40.496	2 50.353	3 0.209	3 10.066	3 19.922	3 29.779	3 39.635	3 49.492	17 .050
18	2 40.661	2 50.517	3 0.373	3 10.230	3 20.086	3 29.943	3 39.799	3 49.656	18 .052
19	2 40.825	2 50.681	3 0.538	3 10.394	3 20.251	3 30.107	3 39.964	3 49.820	19 .055
20	2 40.989	2 50.846	3 0.702	3 10.559	3 20.415	3 30.271	3 40.128	3 49.984	20 .057
21	2 41.153	2 51.010	3 0.866	3 10.723	3 20.579	3 30.436	3 40.292	3 50.149	21 .060
22	2 41.318	2 51.174	3 1.031	3 10.887	3 20.744	3 30.600	3 40.456	3 50.313	22 .063
23	2 41.482	2 51.338	3 1.195	3 11.051	3 20.908	3 30.764	3 40.621	3 50.477	23 .066
24	2 41.646	2 51.503	3 1.359	3 11.216	3 21.072	3 30.929	3 40.785	3 50.642	24 .068
25	2 41.810	2 51.667	3 1.523	3 11.380	3 21.236	3 31.093	3 40.949	3 50.806	25 .071
26	2 41.975	2 51.831	3 1.688	3 11.544	3 21.401	3 31.257	3 41.114	3 50.970	26 .074
27	2 42.139	2 51.995	3 1.852	3 11.708	3 21.565	3 31.421	3 41.278	3 51.134	27 .077
28	2 42.303	2 52.160	3 2.016	3 11.873	3 21.729	3 31.586	3 41.442	3 51.299	28 .079
29	2 42.468	2 52.324	3 2.181	3 12.037	3 21.893	3 31.750	3 41.606	3 51.463	29 .082
30	2 42.632	2 52.488	3 2.345	3 12.201	3 22.058	3 31.914	3 41.771	3 51.627	30 .085
31	2 42.796	2 52.653	3 2.509	3 12.366	3 22.222	3 32.078	3 41.935	3 51.791	31 .088
32	2 42.960	2 52.817	3 2.673	3 12.530	3 22.386	3 32.243	3 42.099	3 51.956	32 .090
33	2 43.125	2 52.981	3 2.838	3 12.694	3 22.551	3 32.407	3 42.264	3 52.120	33 .093
34	2 43.289	2 53.145	3 3.002	3 12.858	3 22.715	3 32.571	3 42.428	3 52.284	34 .096
35	2 43.453	2 53.310	3 3.166	3 13.023	3 22.879	3 32.736	3 42.592	3 52.449	35 .099
36	2 43.617	2 53.474	3 3.330	3 13.187	3 23.043	3 32.900	3 42.756	3 52.613	36 .101
37	2 43.782	2 53.638	3 3.495	3 13.351	3 23.208	3 33.064	3 42.921	3 52.777	37 .104
38	2 43.946	2 53.803	3 3.659	3 13.515	3 23.372	3 33.228	3 43.085	3 52.941	38 .107
39	2 44.110	2 53.967	3 3.823	3 13.680	3 23.536	3 33.393	3 43.249	3 53.106	39 .110
40	2 44.275	2 54.131	3 3.988	3 13.844	3 23.700	3 33.557	3 43.413	3 53.270	40 .112
41	2 44.439	2 54.295	3 4.152	3 14.008	3 23.865	3 33.721	3 43.578	3 53.434	41 .115
42	2 44.603	2 54.460	3 4.316	3 14.173	3 24.029	3 33.886	3 43.742	3 53.598	42 .118
43	2 44.767	2 54.624	3 4.480	3 14.337	3 24.193	3 34.050	3 43.906	3 53.763	43 .120
44	2 44.932	2 54.788	3 4.645	3 14.501	3 24.358	3 34.214	3 44.071	3 53.927	44 .123
45	2 45.096	2 54.952	3 4.809	3 14.665	3 24.522	3 34.378	3 44.235	3 54.091	45 .126
46	2 45.260	2 55.117	3 4.973	3 14.830	3 24.686	3 34.543	3 44.399	3 54.256	46 .129
47	2 45.425	2 55.281	3 5.137	3 14.994	3 24.850	3 34.707	3 44.563	3 54.420	47 .131
48	2 45.589	2 55.445	3 5.302	3 15.158	3 25.015	3 34.871	3 44.728	3 54.584	48 .134
49	2 45.753	2 55.610	3 5.466	3 15.322	3 25.179	3 35.035	3 44.892	3 54.748	49 .137
50	2 45.917	2 55.774	3 5.630	3 15.487	3 25.343	3 35.200	3 45.056	3 54.913	50 .140
51	2 46.082	2 55.938	3 5.795	3 15.651	3 25.508	3 35.364	3 45.220	3 55.077	51 .142
52	2 46.246	2 56.102	3 5.959	3 15.815	3 25.672	3 35.528	3 45.385	3 55.241	52 .145
53	2 46.410	2 56.267	3 6.123	3 15.980	3 25.836	3 35.693	3 45.549	3 55.405	53 .148
54	2 46.574	2 56.431	3 6.287	3 16.144	3 26.000	3 35.857	3 45.713	3 55.570	54 .151
55	2 46.739	2 56.595	3 6.452	3 16.308	3 26.165	3 36.021	3 45.878	3 55.734	55 .153
56	2 46.903	2 56.759	3 6.616	3 16.472	3 26.329	3 36.185	3 46.042	3 55.898	56 .156
57	2 47.067	2 56.924	3 6.780	3 16.637	3 26.493	3 36.350	3 46.206	3 56.063	57 .159
58	2 47.232	2 57.088	3 6.944	3 16.801	3 26.657	3 36.514	3 46.370	3 56.227	58 .162
59	2 47.396	2 57.252	3 7.109	3 16.965	3 26.822	3 36.678	3 46.535	3 56.391	



# TABLE IV.

TABLE GIVING, FOR SEVEN POLAR STARS, THE CORRECTIONS  
OF THE APPARENT PLACE WHICH DEPEND ON THE  
ARGUMENT  $2\varphi$  IN NUTATION.—1870.0.

$\varphi$ or $\varphi - 180^\circ$	$\alpha$ Urs. Min.		51 Cephei.		32 Camelop.		$\epsilon$ Urs. Min.		$\delta$ Urs. Min.		$\lambda$ Urs. Min.		$\sigma$ Octantis.		$\varphi$ or $\varphi - 180^\circ$
	R. A.	Dec.	R. A.	Dec.	R. A.	Dec.	R. A.	Dec.	R. A.	Dec.	R. A.	Dec.	R. A.	Dec.	
0°	-.233	+.03	+.021	+.09	+.056	-.02	+.011	-.09	-.006	-.09	-.150	-.08	+.013	-.09	90°
2	-.238	.02	.012	.09	.056	.01	.013	.08	-.001	.09	.133	.08	-.018	.09	92
4	.242	.02	+.003	.09	.055	-.01	.015	.08	+.005	.09	.115	.08	.049	.09	94
6	.245	+.01	-.005	.09	.055	.00	.016	.08	.010	.09	.097	.08	.080	.09	96
8	.246	.00	.014	.09	.054	.00	.018	.08	.016	.09	.078	.09	.110	.09	98
10	-.246	.00	-.023	+.09	+.052	+.01	+.019	-.07	+.021	-.08	-.059	-.09	-.139	-.08	100
12	.246	-.01	.031	.09	.051	.01	.021	.07	.026	.08	.040	.09	.168	.08	102
14	.244	.01	.039	.08	.049	.02	.022	.07	.031	.08	-.020	.09	.196	.08	104
16	.241	.02	.048	.08	.047	.03	.023	.06	.036	.08	.000	.09	.224	.08	106
18	.237	.02	.056	.08	.045	.03	.024	.06	.041	.07	+.019	.09	.250	.07	108
20	-.230	-.03	-.063	+.08	+.042	+.04	+.025	-.05	+.046	-.07	+.039	-.08	-.275	-.07	110
22	.224	.03	.071	.07	.039	.04	.026	.05	.050	.07	.058	.08	.298	.07	112
24	.216	.04	.078	.07	.036	.05	.027	.04	.054	.06	.078	.08	.320	.06	114
26	.207	.04	.084	.07	.033	.05	.027	.04	.058	.06	.097	.08	.341	.06	116
28	.197	.05	.091	.06	.030	.06	.028	.03	.062	.05	.115	.08	.360	.05	118
30	-.187	-.05	-.036	+.06	+.027	+.06	+.028	-.02	+.065	-.05	+.133	-.07	-.377	-.05	120
32	.175	.06	.102	.05	.023	.06	.028	.02	.068	.04	.150	.07	.392	.04	122
34	.162	.06	.107	.05	.020	.07	.028	.01	.071	.04	.166	.07	.406	.03	124
36	.149	.07	.111	.04	.016	.07	.028	-.01	.073	.03	.182	.06	.417	.03	126
38	.135	.07	.115	.03	.012	.07	.028	.00	.075	.03	.196	.06	.426	.02	128
40	-.120	-.07	-.118	+.03	+.008	+.07	+.028	+.01	+.077	-.02	+.210	-.05	-.434	-.02	130
42	.105	.07	.120	.02	+.004	.08	.027	.01	.078	.01	.223	.05	.439	.01	132
44	.089	.08	.122	.02	.000	.08	.026	.02	.079	-.01	.235	.04	.442	-.01	134
46	.073	.08	.124	+.01	-.004	.08	.026	.02	.079	.00	.245	.04	.443	.00	136
48	.056	.08	.125	.00	.007	.08	.025	.03	.079	.00	.254	.03	.442	+.01	138
50	-.039	-.03	-.125	.00	-.011	+.08	+.024	+.04	+.079	+.01	+.262	-.02	-.438	+.01	140
52	.022	.08	.125	-.01	.015	.08	.023	.04	.078	.02	.269	.02	.433	.02	142
54	-.005	.08	.124	.01	.019	.08	.021	.05	.077	.02	.275	.01	.425	.02	144
56	+.012	.08	.122	.02	.022	.08	.020	.05	.075	.03	.279	-.01	.415	.03	146
58	.029	.08	.120	.03	.026	.08	.018	.06	.073	.03	.282	.00	.404	.04	148
60	+.046	-.08	-.117	-.03	-.029	+.08	+.017	+.06	+.071	+.04	+.283	+.01	-.390	+.04	150
62	.063	.08	.114	.04	.033	.08	.015	.07	.069	.04	.283	.01	.374	.05	152
64	.079	.08	.110	.04	.036	.07	.014	.07	.066	.05	.281	.02	.357	.05	154
66	.095	.08	.106	.05	.039	.07	.012	.07	.063	.05	.279	.02	.338	.06	156
68	.111	.07	.101	.05	.041	.07	.010	.08	.059	.06	.275	.03	.317	.06	158
70	+.126	-.07	-.095	-.06	-.044	+.06	+.008	+.08	+.055	+.06	+.269	+.03	-.294	+.07	160
72	.141	.07	.089	.06	.046	.06	.006	.08	.051	.07	.263	.04	.271	.07	162
74	.154	.06	.083	.07	.048	.06	.004	.08	.047	.07	.255	.04	.245	.07	164
76	.167	.06	.076	.07	.050	.05	+.002	.08	.043	.08	.245	.05	.219	.08	166
78	.180	.06	.069	.07	.052	.05	.000	.09	.038	.08	.235	.05	.192	.08	168
80	+.191	-.05	-.062	-.08	-.053	+.04	-.002	+.09	+.033	+.08	+.223	+.06	-.163	+.08	170
82	.201	.05	.054	.08	.054	.04	.004	.09	.028	.08	.210	.06	.134	.08	172
84	.211	.04	.046	.08	.055	.03	.006	.09	.023	.09	.197	.07	.105	.09	174
86	.219	.04	.038	.08	.056	.03	.008	.09	.017	.09	.182	.07	.074	.09	176
88	.226	.03	.029	.09	.056	.02	.010	.09	.012	.09	.166	.08	.044	.09	178
90	+.233	-.03	-.021	-.09	-.056	+.02	-.011	+.09	+.006	+.09	+.150	+.08	-.013	+.09	180

NOTE.—When the Argument is on the right-hand side of the Table, the sign of the correction is to be reversed.  
The Moon's Mean Longitude,  $\varphi$ , may be found on page 344.

# TABLE V.

TABLE GIVING THE CORRECTIONS OF THE CONSTANTS *A* AND *B* WHICH  
DEPEND ON THE ARGUMENT  $2\varphi$ , IN UNITS OF THE FIFTH  
DECIMAL FOR *A*, AND OF THE FOURTH FOR *B*.

$\varphi$ or $\varphi - 180^\circ$	<i>A</i> .	<i>B</i> .	$\varphi$ or $\varphi - 180^\circ$	<i>A</i> .	<i>B</i> .	$\varphi$ or $\varphi - 180^\circ$	<i>A</i> .	<i>B</i> .	$\varphi$ or $\varphi - 180^\circ$	<i>A</i> .	<i>B</i> .
0	— 0	—886	45	—405	+ 0	90	+ 0	+886	135	+405	— 0
1	14	885	46	405	31	91	14	885	136	405	31
2	29	883	47	404	61	92	29	883	137	404	61
3	42	881	48	403	93	93	42	881	138	403	93
4	56	877	49	401	124	94	56	877	139	401	124
5	— 70	—872	50	—399	+153	95	+ 70	+872	140	+399	—153
6	84	866	51	396	184	96	84	866	141	396	184
7	98	859	52	393	215	97	98	859	142	393	215
8	112	851	53	389	244	98	112	851	143	389	244
9	125	843	54	385	274	99	125	843	144	385	274
10	—138	—833	55	—350	+303	100	+138	+833	145	+380	—303
11	152	821	56	375	331	101	152	821	146	375	331
12	165	809	57	370	360	102	165	809	147	370	360
13	178	796	58	364	388	103	178	796	148	364	388
14	190	782	59	358	415	104	190	782	149	358	415
15	—202	—767	60	—351	+443	105	+202	+767	150	+351	—443
16	214	751	61	344	470	106	214	751	151	344	470
17	226	734	62	336	495	107	226	734	152	336	495
18	238	716	63	328	520	108	238	716	153	328	520
19	249	698	64	319	545	109	249	698	154	319	545
20	—261	—678	65	—310	+570	110	+261	+678	155	+310	—570
21	271	659	66	301	592	111	271	659	156	301	592
22	282	637	67	291	615	112	282	637	157	291	615
23	291	615	68	282	637	113	291	615	158	282	637
24	301	592	69	271	659	114	301	592	159	271	659
25	—310	—570	70	—261	+678	115	+310	+570	160	+261	—678
26	319	545	71	249	698	116	319	545	161	249	698
27	328	520	72	238	716	117	328	520	162	238	716
28	336	495	73	226	734	118	336	495	163	226	734
29	344	470	74	214	751	119	344	470	164	214	751
30	—351	—443	75	—202	+767	120	+351	+443	165	+202	—767
31	358	415	76	190	782	121	358	415	166	190	782
32	364	388	77	178	796	122	364	388	167	178	796
33	370	360	78	165	809	123	370	360	168	165	809
34	375	331	79	152	821	124	375	331	169	152	821
35	—380	—303	80	—138	+833	125	+380	+303	170	+138	—833
36	385	274	81	125	843	126	385	274	171	125	843
37	389	244	82	112	851	127	389	244	172	112	851
38	393	215	83	98	859	128	393	215	173	98	859
39	396	184	84	84	866	129	396	184	174	84	866
40	—399	—153	85	— 70	+872	130	+399	+153	175	+ 70	—872
41	401	124	86	56	877	131	401	124	176	56	877
42	403	93	87	42	881	132	403	93	177	42	881
43	404	61	88	29	883	133	404	61	178	29	883
44	405	31	89	14	885	134	405	31	179	14	885
45	—405	— 0	90	— 0	+886	135	+405	+ 0	180	+ 0	—886

NOTE.—The Moon's Mean Longitude,  $\varphi$ , may be found on page 344.

# TABLE VI.

TABLE GIVING THE CORRECTIONS OF THE CONSTANTS  $A$  AND  $B$  DEPEND-  
ING ON THE SMALL TERMS OF THE NUTATION, IN UNITS OF THE  
FIFTH DECIMAL FOR  $A$ , AND OF THE FOURTH FOR  $B$ .

Arg.	$\epsilon - \Gamma'$	$2\odot - 2\Gamma'$	$2\odot - 2\Omega$	$2\odot - \Omega$		$2\Gamma' - \Omega$		$\Gamma'$		$\odot$	
	$A$	$A$	$A$	$A$	$B$	$A$	$B$	$A$	$B$	$A$	$B$
0	+ 0	+ 0	- 0	+ 0	+67	+ 0	+24	+ 5	+ 8	-11	- 5
10	23	2	1	4	66	2	24	6	+ 4	10	+ 9
20	46	3	2	9	63	3	23	7	- 2	7	21
30	68	5	2	12	58	4	21	8	8	- 2	27
40	87	6	3	16	51	6	18	8	13	+ 4	25
50	+103	+ 8	- 4	+19	+43	+ 7	+15	+ 7	-19	+ 8	+17
60	117	9	4	22	34	8	12	6	24	11	+ 5
70	127	9	4	24	23	8	8	4	28	10	- 9
80	133	10	5	25	+12	9	+ 4	+ 2	30	7	21
90	135	10	5	25	0	9	0	0	31	+ 2	27
100	+133	+10	- 5	+25	-12	+ 9	- 4	- 2	-30	- 4	-25
110	127	9	5	24	23	8	8	4	28	8	17
120	117	9	4	22	34	8	12	6	24	11	- 5
130	103	8	4	19	43	7	15	7	19	10	+ 9
140	87	6	3	16	51	6	18	8	13	7	21
150	+ 68	+ 5	- 2	+12	-58	+ 4	-21	- 8	- 8	- 2	+27
160	46	3	2	9	63	3	23	7	- 2	+ 4	25
170	+ 23	+ 2	- 1	+ 4	66	+ 2	24	6	+ 4	8	17
180	0	0	0	0	67	0	24	5	8	11	+ 5
190	- 23	- 2	+ 1	- 4	66	- 2	24	4	12	10	- 9
200	- 46	- 3	+ 2	- 9	-63	- 3	-23	- 2	+14	+ 7	-21
210	68	5	2	12	58	4	21	- 1	16	+ 2	27
220	87	6	3	16	51	6	18	0	16	- 4	25
230	103	8	4	19	43	7	15	+ 1	16	8	17
240	117	9	4	22	34	8	12	1	16	11	- 5
250	-127	- 9	+ 5	-24	-23	- 8	- 8	+ 1	+16	-10	+ 9
260	133	10	5	25	-12	9	- 4	0	15	7	21
270	135	10	5	25	0	9	0	0	15	- 2	27
280	133	10	5	25	+12	9	+ 4	0	15	+ 4	25
290	127	9	5	24	23	8	8	- 1	16	8	17
300	117	9	4	22	34	8	12	1	16	11	+ 5
310	-103	- 8	+ 4	-19	+43	- 7	+15	- 1	+16	+10	- 9
320	87	6	3	16	51	6	18	0	16	7	21
330	68	5	2	12	58	4	21	+ 1	16	+ 2	27
340	46	3	2	9	63	3	23	2	14	- 4	25
350	23	2	1	4	66	2	24	4	12	8	17
360	- 0	- 0	+ 0	- 0	+67	- 0	+24	+ 5	+ 8	-11	- 5

Year.	$\epsilon - \Gamma'$	$2\odot - 2\Gamma'$	$2\odot - 2\Omega$	$2\odot - \Omega$	$2\Gamma' - \Omega$	$\Gamma'$	$3\odot - \Gamma$
1865	335.6	221.2	129.7	345.6	124.5	350.3	202.0
1866	64.4	139.3	167.8	4.5	225.2	31.0	201.3
1867	153.1	57.5	206.0	23.4	325.9	71.7	200.6
1868	254.9	337.4	246.3	44.3	66.8	112.4	202.9
1869	343.6	255.6	284.5	62.2	167.5	153.1	202.2
1870	72.3	173.8	322.7	81.1	268.2	193.7	201.5
1871	161.0	91.9	0.9	100.0	8.9	234.4	200.9
1872	262.8	11.8	41.2	121.0	109.8	275.2	203.1
1873	351.5	290.0	79.4	139.9	210.5	315.8	202.5
1874	80.3	208.2	117.7	158.8	311.2	356.5	201.8
Daily Motion.	13.065	1.749	2.007	2.024	0.276	0.111	2.957

NOTE.—The arguments given above are for Jan. 0.5 in common years, but for Jan. 1.5 in leap years.















4-09

